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THE
FAR EASTERN
REVIEW
Engineering
Finance Commerce

YALE UNIVERSITY

MAR 17 1915

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Vol. X., No. 11.

SHANGHAI—MANILA

April, 1914.

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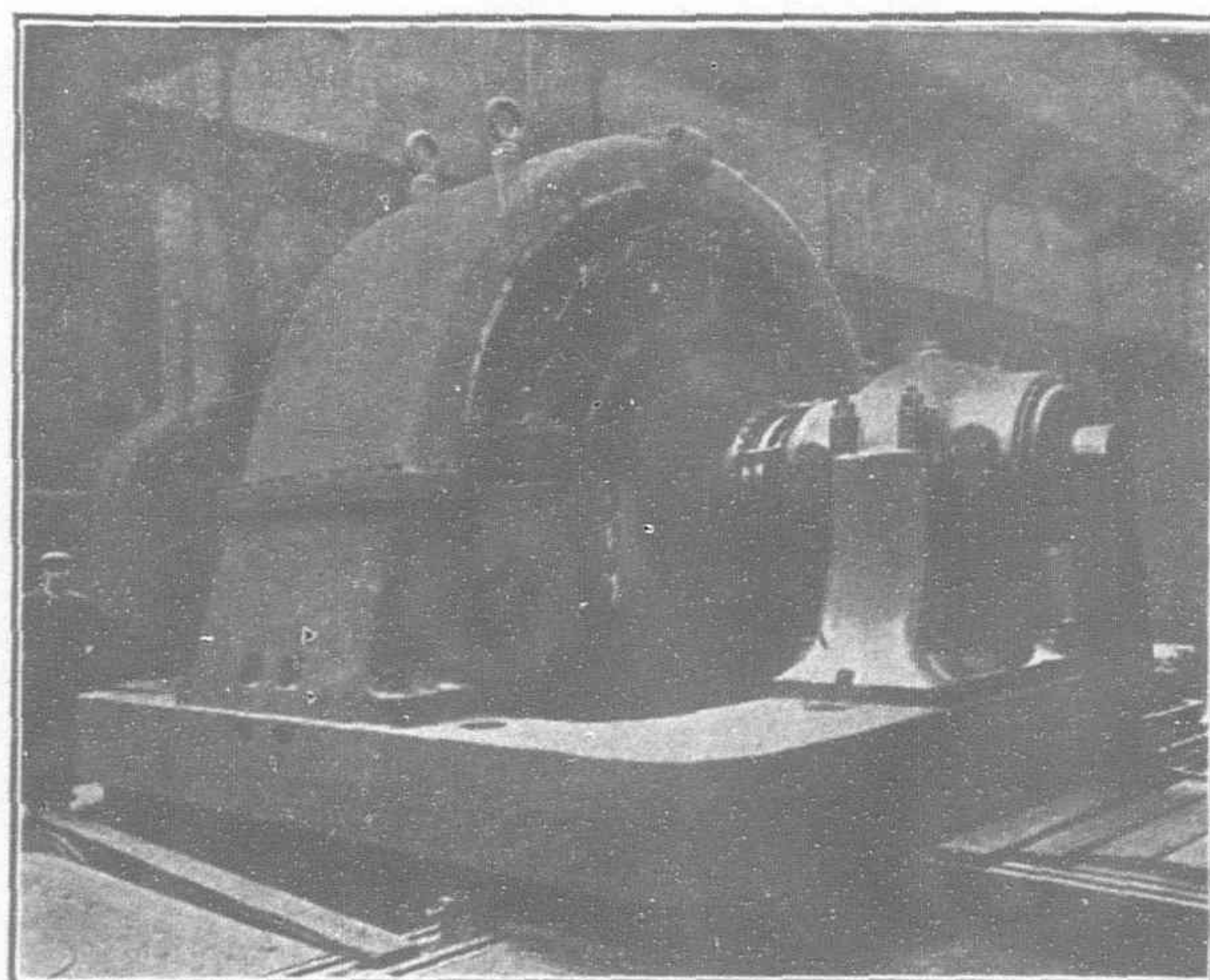
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THE FAR EASTERN REVIEW

COMMERCE :: ENGINEERING :: FINANCE

VOL. X.

SHANGHAI AND MANILA, APRIL, 1914

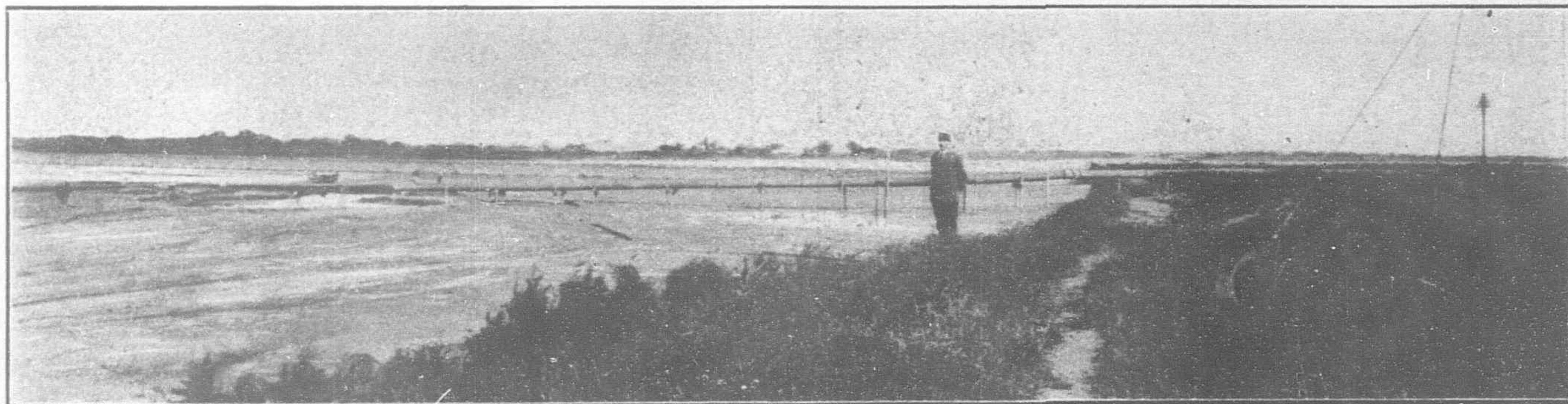
No. 11

THE WHANGPOO RIVER CONSERVANCY

An historical survey of the measures taken to deepen and improve the riverine approach to Shanghai.

The raison d'être for Shanghai is the Whangpoo River. It is true that had there been no river there might have been a town or townlet, but there would not and could not have been the Shanghai of to-day; a city that causes visitors to whom it had before been but a geographical term, surprised admiration; a city that inspires in those who live in it a sense of justifiable pride. That this pride is not misplaced is manifested, not only by the magnificent buildings that have been and are supplanting the dingy old places that were good enough for Shanghai in its early youth—as a foreign settlement—but also by the trustworthy figures of the Maritime Customs Reports. In 1864 the total tonnage of shipping entered and cleared was 1,788,059, in 1912 it was 18,368,701. The net foreign imports in 1864 were valued at Haikwan Taels * 12,798,828, in 1912 the value was about Haikwan

The outer bar had only about 16 feet of water at low water and the inner bar a depth of 11 to 14 feet. Vessels of any size had to lighter their cargo at Woosung, and smaller vessels had to wait for high water before making the port. This involved delay and expense, and the foreigners quite realized that the obvious thing to be done was to improve the approaches to the port. Unfortunately this realization could not be brought home to the Chinese officials. Old China invariably adopted the attitude of rejecting proposals made to her by the outer barbarian, even though they were obviously in her own interest. This was a case in point. Shanghai was the largest contributor to the revenue derived from the Customs tariff. Any measures to improve the facilities of Shanghai as a port could only tend to the increase of the tangible monetary return obtained by the Imperial Government. But the



Pumping dredged material into the old Ship Channel.

Taels 210,000,000. Other statistics could be given if necessary to show the proud position that Shanghai occupies among Far Eastern ports, but they would be foreign to our immediate object.

Shanghai, according to Morse, was mentioned in history 2,150 years ago, but the kind of history manufactured in those days is not of interest to present day readers. It really came into foreign purview in 1842 when the city was occupied by British military and naval forces. By the Treaty of Nanking Shanghai was declared a treaty port and was opened to foreign trade on November 17, 1843. The Whangpoo was in a pretty bad condition even then, but the vessels employed in the China trade were of light draft and the bars at the entrance caused little difficulty. The constant increase in the size of vessels and the general employment of steamers instead of sailing vessels, however, began to cause the foreign merchants who had established themselves at Shanghai some disquietude in regard to the future of the port.

implacably obstructionist officials of China declined to consider this aspect of the matter. It was quite sufficient that the foreigner had suggested that the approaches to Shanghai should be improved. That was a clear indication, the obtuse officialdom of that day thought, that China's interest lay in allowing them to become worse. In those distressing days, now happily passing, the anti-improvement spirit was so strong in Chinese official circles that actual delight was felt in defeating any proposal intended for the joint benefit of China and those foreigners who had elected to endeavour to develop her trade with overseas countries. The hand of peace in those days could not turn the handle of the door opening upon larger opportunities. That was reserved for the mailed hand of war. There is not much truth as a rule in generalities, but it may be said that in the past any advantages that China has gained from her association with the civilized world have necessarily been handed to her on the point of the bayonet. This was the case with the improvement of the approaches to Shanghai, and also to Tientsin. The Chinese official view was that the bars at the mouths of the Whangpoo and

* A Haikwan Tael during 1912 was equivalent to 3s 0½d English currency and \$0.74 U. S. currency.

the Peiho were heaven-provided barriers against the men-of-war of the barbarian. The Boxer Rising forced China to change her views. After the failure of that luckless effort to drive the barbarians into the sea China had to sign a peace protocol with the eleven Powers interested. Article VI of the final protocol signed in 1901 provided for the payment of an indemnity of 450 millions of Haikwan Taels, and concludes with the sub-clause:—

"The beds of the rivers Whangpoo and Peiho shall be repaired with the financial participation of China."

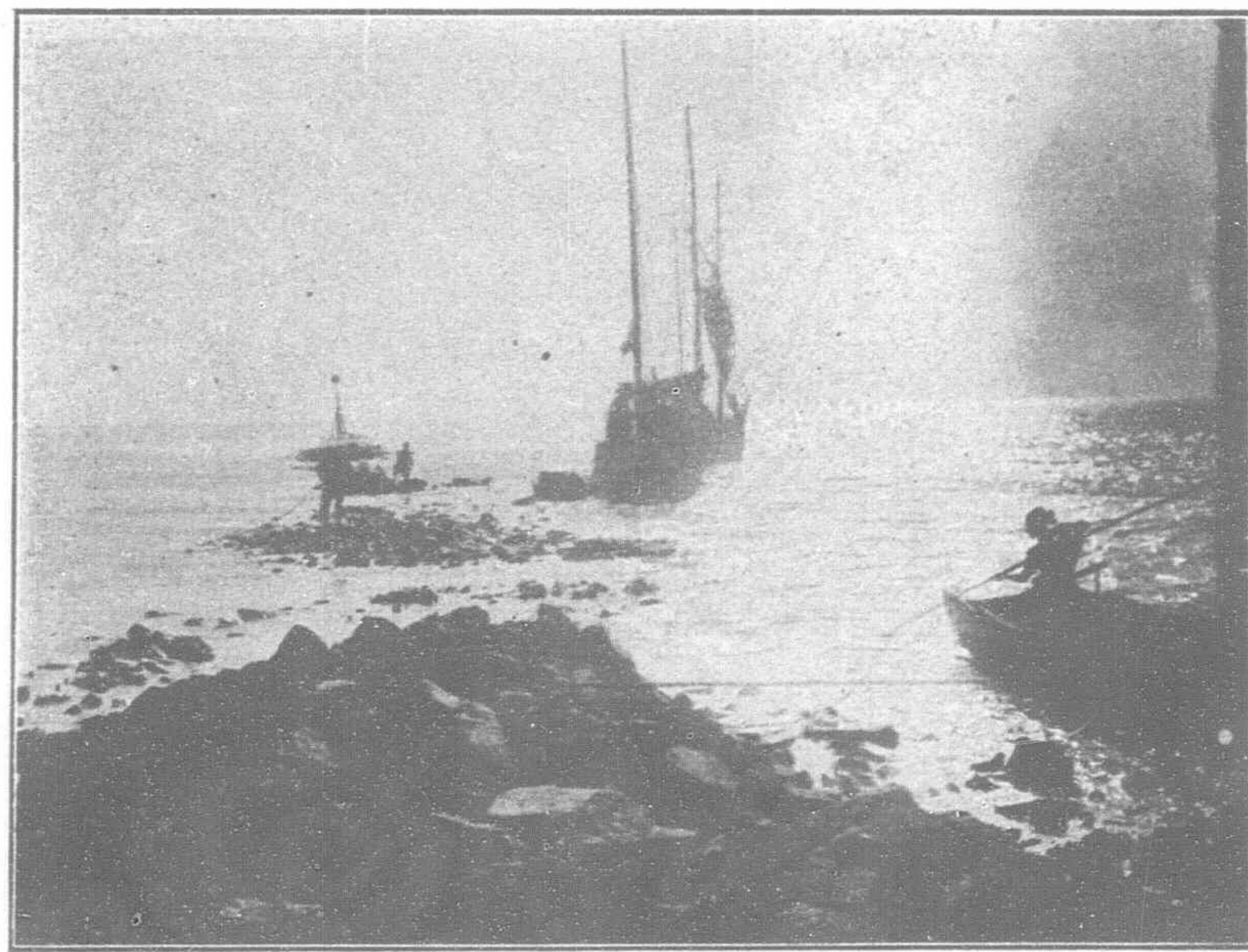
Article XI of the protocol says:—

"The Chinese Government has agreed to negotiate the amendments deemed necessary by the foreign Governments to the Treaties of Commerce and Navigation and the other subjects concerning commercial relations with the object of facilitating them."

This Board shall consist of members representing the interests of the Chinese Government and those of foreigners in the shipping trade of Shanghai.

The expenses incurred for the works and the general management of the undertaking are estimated at the annual sum of 460,000 Haikwan Taels for the first twenty years. This sum shall be supplied in equal portions by the Chinese Government and the foreign interests concerned.

This was a great triumph for the foreign residents of Shanghai, who at last had a definite undertaking from the Chinese Government that due attention would be given to the modern requirements of the port.* No practical steps were taken, however, until September 1905 when an agreement was entered into between the Chinese Government and the Treaty Powers, providing that the necessary conservancy operations



Four views showing progress of parallel dam work.

At present, and as a result of the stipulation contained in Article VI concerning the indemnity, the Chinese Government agrees to assist in the improvement of the courses of the rivers Peiho and Whangpoo, as stated below.

- (a) The works for the improvement of the navigability of the Peiho, begun in 1898 with the co-operation of the Chinese Government, have been resumed under the direction of an International Commission. As soon as the administration of Tientsin shall have been handed back to the Chinese Government it will be in a position to be represented on this Commission, and will pay each year a sum of 60,000 Haikwan Taels for maintaining the works.
- (b) A Conservancy Board, charged with the management and control of the works for straightening the Whangpoo and the improvement of the course of that river, is hereby created.

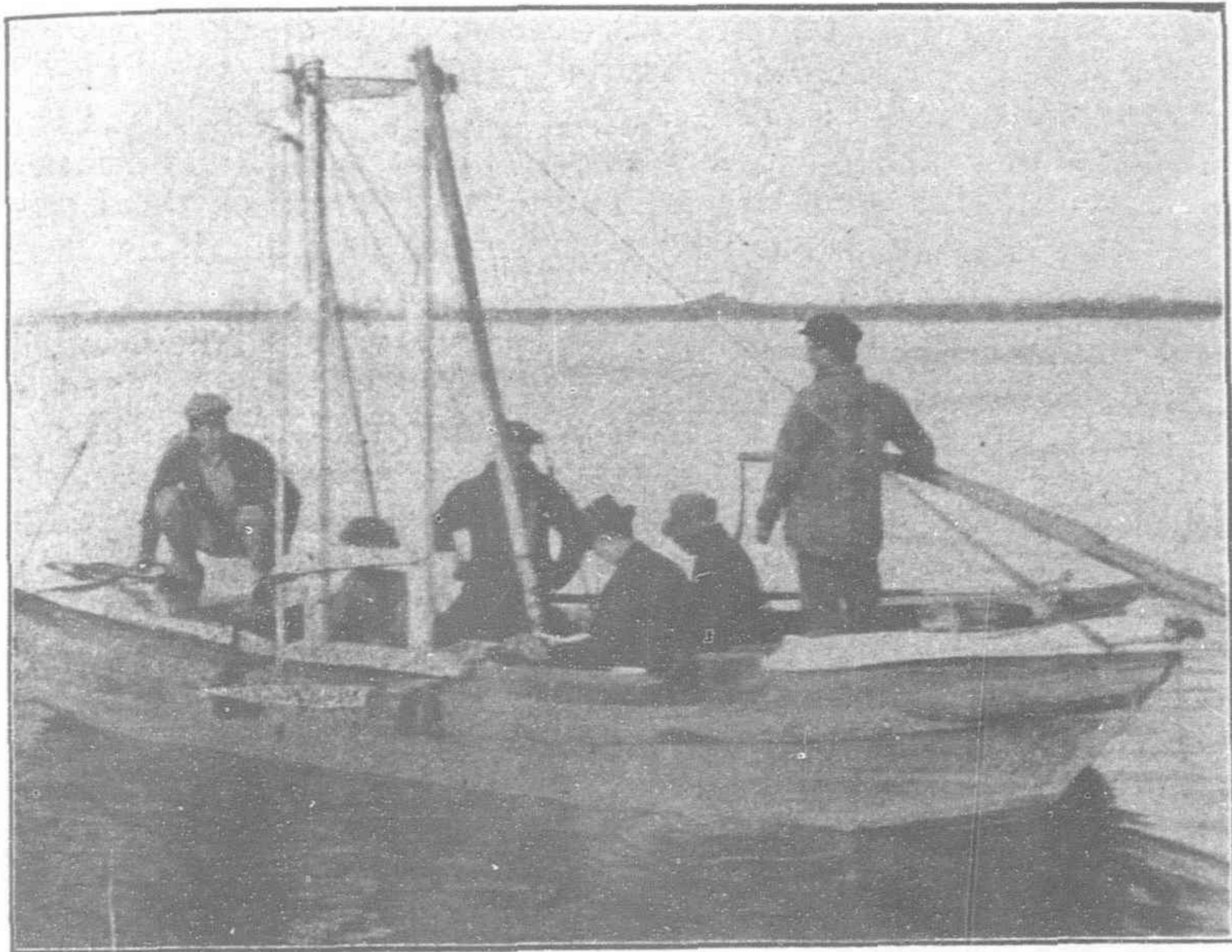
should be carried on by the Chinese Government, at its sole expense, under a Board constituted of the Shanghai Customs Taotai and the Commissioner of Customs, with equal powers, with consultative and critical functions reserved for the Shanghai Consular Body. A Government contribution of Hk. Tls. 460,000 per annum during 20 years was pledged for conservancy purposes, and sanction given

* The history of the conservancy operations which follows is largely taken from a memorandum contributed to the Decennial Customs Reports by Mr. H. von Heidenstam, Engineer-in-Chief to the Board, and from the notes on Conservancy work by the Commissioner of Customs in Shanghai in his yearly reports.

to the taking up of loans, if required, to render greater speed in the work possible.

It was further stipulated that every three months a report on the progress of works and expenditure was to be submitted to the Consular Body, with which Body it rested to make effective representations in case of unsatisfactory progress. The appointment of the engineer to carry out conservancy works was made subject to the approval of a majority of the representatives of the signatory Powers in Peking.

The Whangpoo Conservancy Board, which consisted of Taotai Jui Cheng and Mr. H. E. Hobson, then Commissioner of Customs, began its activity in 1906, and the choice of engineer fell on Mr. J. De Rijke, a Dutch engineer formerly in Japanese Government service, who had previously been called upon to investigate the river, and had submitted schemes for its improvement.



Current meter to depth of 10 feet.

The scheme advocated by De Rijke for dealing with the lower parts of the river embraced two principal undertakings: (1) the training of the river over the Outer Bar by means of a jetty with a shoreconnecting sea dike on the concave Woosung bank and a parallel dam assisted by a group of cribs on the opposite shore; (2) the abandoning and closing of the existing fairway, the Ship Channel, with its "Inner Bar," and the development, by dredging and training, of a shorter route by way of the so-called "Junk Channel" on the other side of Gough Island.

Preparative work, trials, tests, and some temporary protection-work of the Ship Channel bend were started in the summer of 1906; but actual training-work began first in January 1907, with the restraining of the lower entrance of the Ship Channel and, simultaneously, the training of the Junk Channel on the other side of the island. The training of the channel over the Outer Bar commenced on September 19, 1907, with the principal training-works on the left bank, which were called "the Woosung Outer Bar training-works." These works included the long principal jetty, with a shore-connecting sea dike, behind which a reclamation, embracing a shallow work-harbour, was created by pumping up dredged material, and a training-dike or crib a little further up the river. They were all included in one large contract, which was given to a Dutch contractor—the East Asiatic Dredging Company—for a sum approximately Sh. Tls. 2,000,000.

The dredging required for the development of a new fairway through the Junk Channel was started on November 19 under another large contract, made with the same contractors, for 6½ million cubic yards (barge measure), at a price of Sh. Tls. 0.30 per unit, making the total price Sh. Tls. 2,000,000. The work started with only three dredgers—two bucket and one suction,—but two additional bucket dredgers arrived later. The excavating of a 15 feet deep channel through the Junk Channel

shallows began just at the upper end of Gough Island in December 1907.

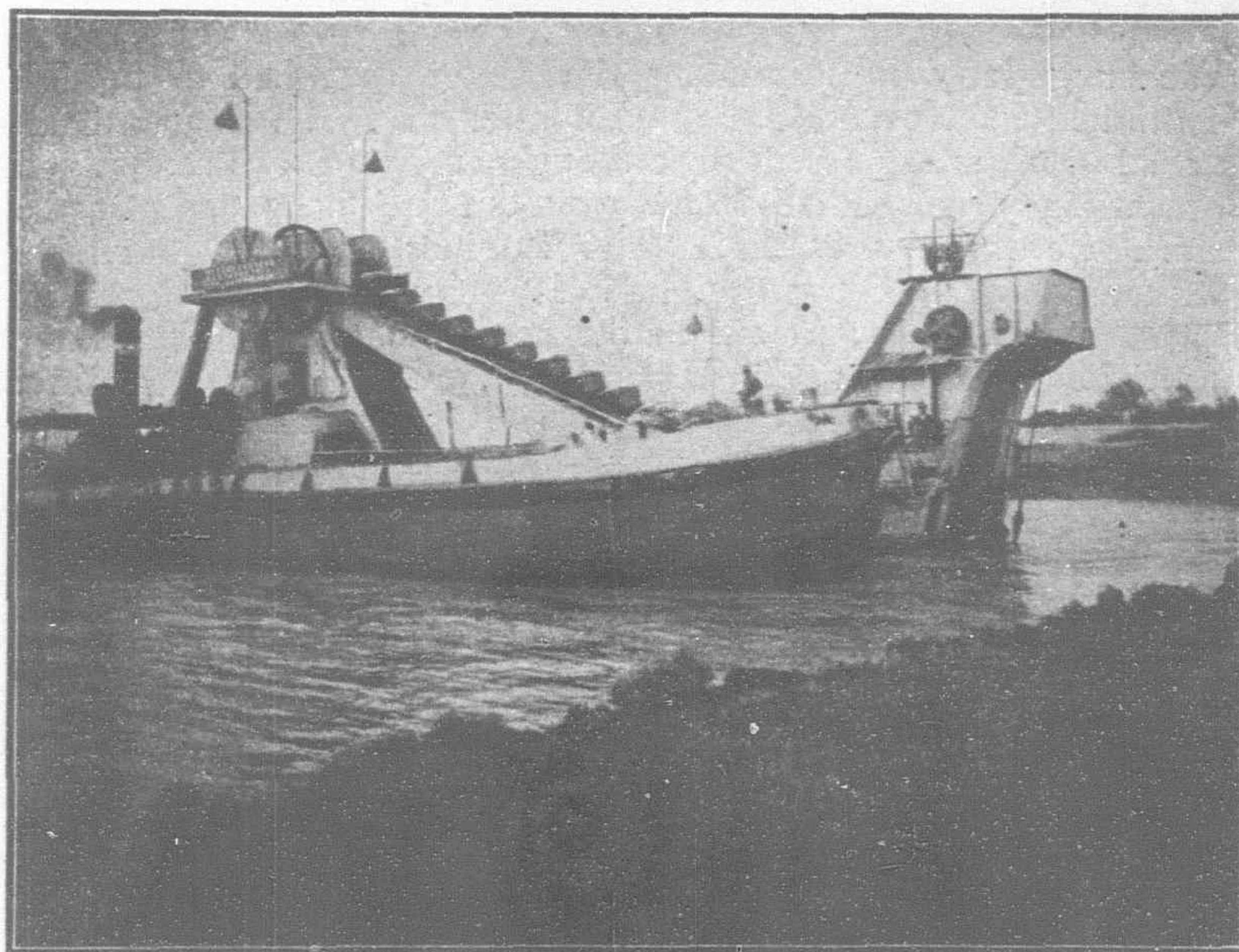
The matter dredged was partly deposited on and between the training-works and partly pumped up to raise certain walled-in areas, which now, having been raised to a height of 14 or 16 feet above low water, represent valuable reclamations. The largest reclamations were made successively at the upper and lower ends of Gough Island and inside the Woosung Jetty, the pumping work forming part of the contract.

From an administrative point of view, the entire work was carried on in three divisions, i.e., (1) the Woosung Outer Bar training-works under one contract; (2) the dredging under another contract; and (3) all other general and training work in Astræa Channel and in the Black Point Beach under the Board's own administration.

The materials used were all of native origin. The brushwood was brought from the Chekiang hills and the stone from the quarries on the coast south of Shanghai. Only the larger timber and piles for the jetty-work had to be imported. The construction of parallel dams and cribs was effected by means of fascine mattresses, made on the well-known Dutch method, and with ordinary fascine-layers, ballasted with rubble stone. Cylindrical bamboo baskets, filled with stone and mantled with brushwood, were also used where speed was a principal requirement.

During 1908 the work progressed steadily and continued to do so also during the first part of the following year. On May 5, 1909, the dredging of the Junk Channel had advanced so far as to allow the British cruiser *Astræa* to pass the new channel at high water, with a draught just under 23 feet. Shortly afterwards this channel was officially opened. From July 1, the traffic was transferred from the old Ship Channel into the new Astræa Channel, and by the end of the year the closing of the Ship Channel had proceeded so far as to render it impassable to all but the smallest vessels.

In July 1909, the dredging contract for 6½ million cubic yards was completed; and in September the additional work, which the Dredging Company had undertaken, free of cost, as penatly



Dredger Shanghai at Pheasant Point.

for certain irregularities, viz., to dredge 500,000 cubic yards, had also come to an end. All dredging operations were then suspended, on account of lack of funds, until on November 26, a new contract for 1,200,000 cubic yards (barge measure) at Sh. Tls. 0.22 per cubic yard was entered into with the Chinese E. Dsing Dredging Company, who, however, sublet the undertaking to the former contractors. In the meantime, during 1909, the contracted work on the Woosung Outer Bar training-works went on without interruption, and the improved depth of 19 to 20 feet was maintained.

The following year, 1910, saw the completion of two items of the conservancy scheme—in September, the blocking of the old Ship Channel, and, in October, the Woosung Outer Bar training-works. But in September, when the amount contracted for was reached, the dredging of the new channel had to stop, although more dredging was urgently recommended. And the work on the group of training-works, that had been begun on the Pootung shore below Pheasant Point, to assist the



Tide-gauge installation in the upper river.

Woosung Jetty in improving the Outer Bar, had to be discontinued in November. In the latter part of this month all actual work was suspended, although only half of the outlined conservancy scheme had been carried out and many parts of the work were left unfinished. The Engineer-in-Chief, Mr. De Rijke, whose great work had thus arrived at a deadlock, terminated his engagement in the same month, and the whole staff was disbanded. In December, the appointment, as Mr. De Rijke's successor, of Mr. H. von Heidenstam, Lieutenant, Royal Swedish Corps of Engineers for Road, River, and Canal Works, was approved by the Diplomatic Body.

During the opening months of 1911 the staff was reorganised on a smaller scale; but in spite of the urgent needs of the half-finished training-works below Pheasant Point, work could not be resumed until April. In December these training-works were practically completed and the Outer Bar had been scoured out by their action, so as to give a depth of 24 feet in the middle of the channel and at least 600 feet between the 20 feet depth curves at lowest low water.

During the year a "Project for the Continued Whangpoo Regulation," with complete details and estimates, was prepared by the Conservancy Engineer-in-Chief, and in October forwarded to the authorities concerned, by whom it was adopted. The estimate for the expenditure required to bring the Whangpoo into a trained and self-maintaining condition so far as practicable, and to produce a clear channel of 24 feet depth at lowest low water and 26½ feet at ordinary low water, was given at Tls. 6,000,000, spread over a period of ten years, these figures being based on the state of the river in October, 1911. Besides the completion of the training-works below Pheasant Point, no other work or dredging could be started, but smaller repairs were duly attended to.

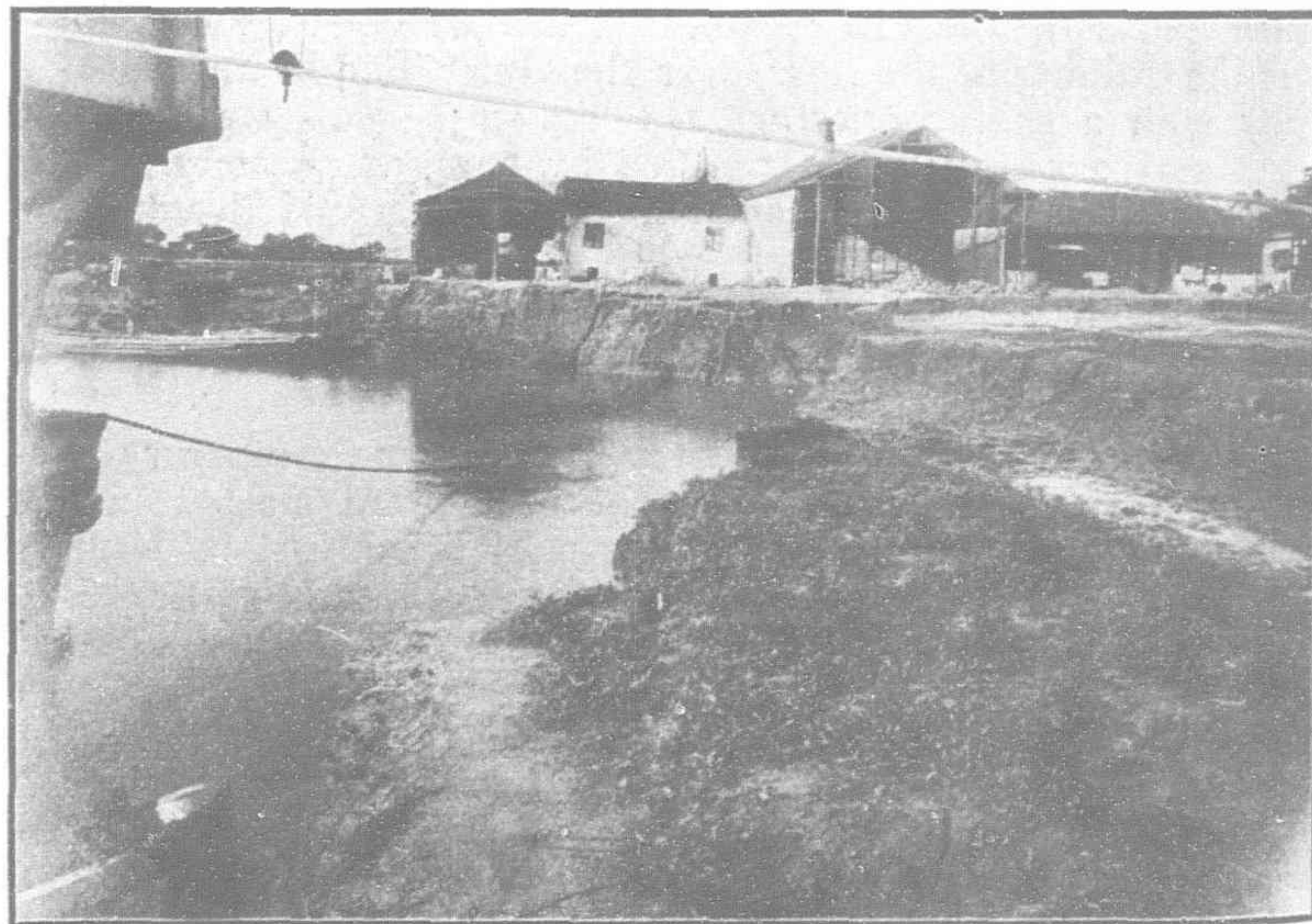
The local results at the Outer Bar had been fully satisfactory in 1911; but the half-finished state of the river regulation pro-

duced an unsettled, unfavourable *régime* of the river, resulting in the increased silting at Pheasant Point and the upper part of Astraea Channel. With the adoption of the Engineer-in-Chief's scheme, however, the Board signified that it realized that it was essential to continue the work as a comprehensive undertaking. As already stated an expenditure of Tls. 6,000,000 was to be involved, spread over a period of ten years. The Engineer-in-Chief recommended that a contract should be given for the necessary cutting above and at Pheasant Point and that one dredger, with all necessary plant and a pumping installation, should be purchased. The work for the first three years was to be carried out on the contract system and thereafter the Board's own dredger, it was considered, would be able to keep the river in good condition.

In summing up the advantages of the proposals he put forward Mr. von Heidenstam made the following statement:—"The regulation of the Whangpoo between Woosung and Shanghai is not an isolated undertaking. Its success depends on two exterior and very variable factors, viz. (1) the state of the Yangtze Estuary, the unchecked vagaries of which might at any time begin to tend to bar Woosung from the Sea, and at the same time reduce the tidal action, and (2) the state of the Upper River above the Upper Harbour Limit, on which the tidal volume is greatly depending.

It is therefore necessary: to follow, closely study and, if required, check the changes of the Yangtze Estuary, and to establish in the Upper River the adherence to certain rules in order to preserve the tidal capacity of the main river and the chief canals and creeks, the obstruction of which by bridge abutments and fishing-screens in each individual case may be a negligible quantity, but not when done over and over again.

In these exterior conditions the next ten years are however not likely to bring about any fatal changes; the actual execution and costs will entirely depend on decisive interior conditions for the economically successful realization of this project, namely, that the definite scheme with a preconceived but elastic order of progress is adhered to; that sufficient staff is kept to carry out a rational system of record-keeping, giving at any moment the state and cost of any item or branch of the work, or material, as well as staff to make and prepare continuous hydrographic observations, forming the only reliable guide for present works and future maintenance.

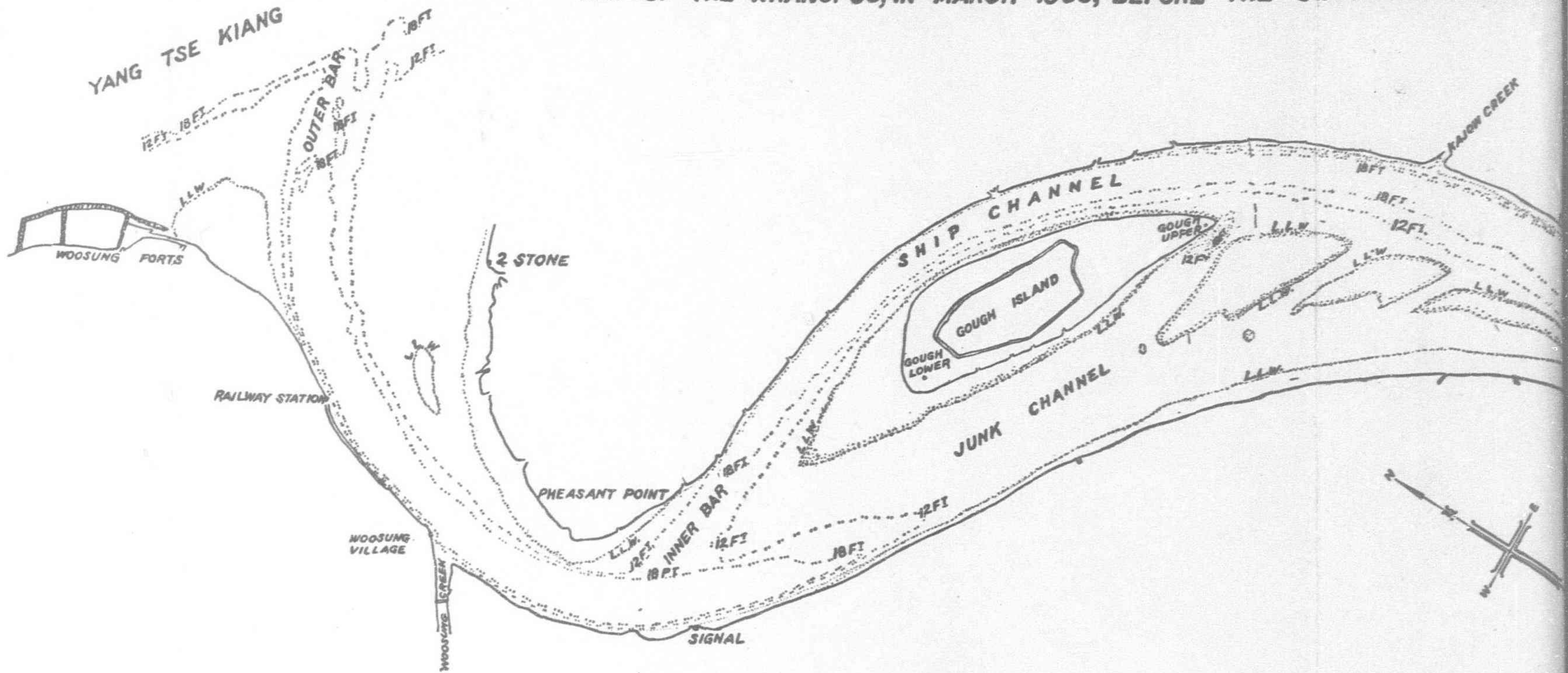


Cutting away Pheasant Point.

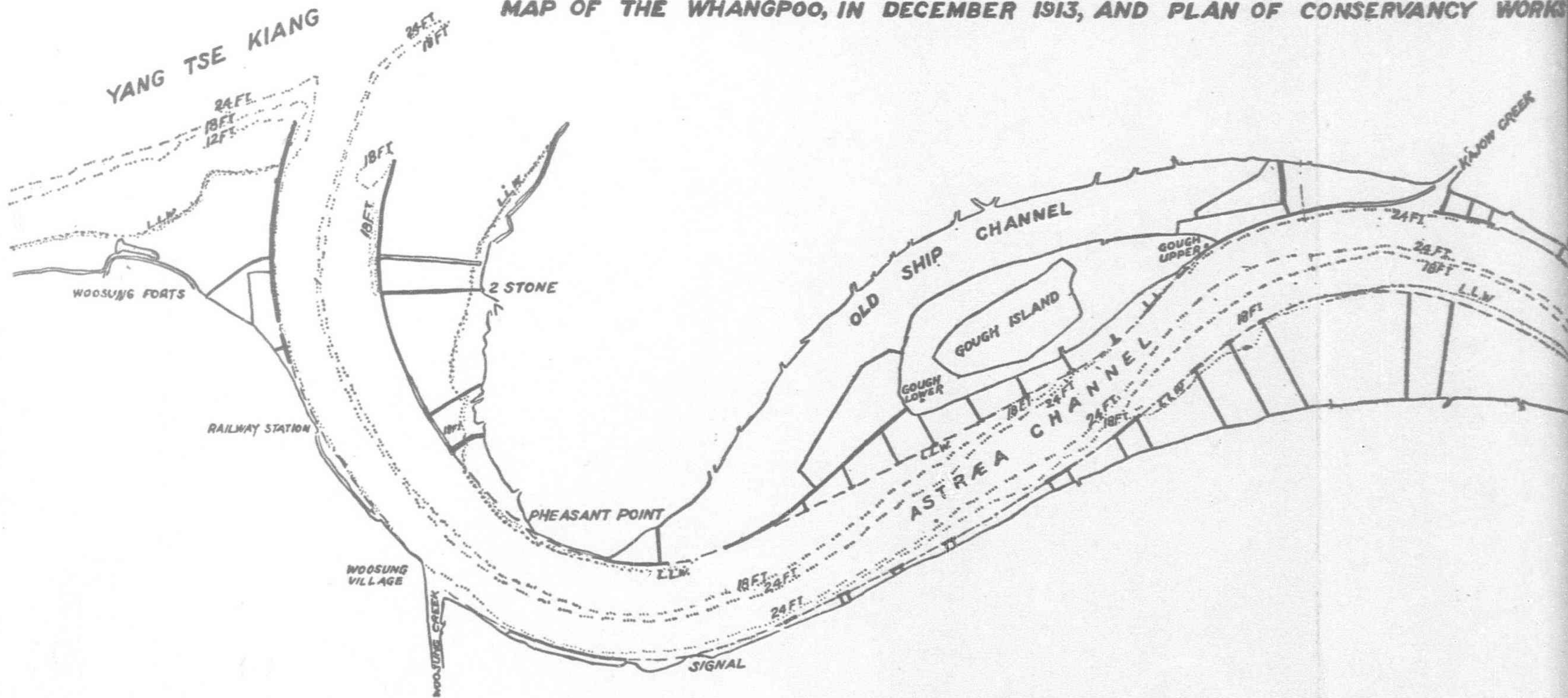
Spasmodic operations carried on at intervals without the guidance of continuous economical and hydrographic statistics cannot be safely estimated for, and there is no guarantee against, but much probability for repetition of mistakes and false operations.

An idea, apt to occur to any body investigating this project might be formulated so: 'Would not, instead of this complete scheme at a cost of Tls. 6,000,000, constant or periodical dredging at the four or five places, where present navigation actually is impeded, be just as efficient and cost less?' And the answer is

MAP OF THE WHANGPOO, IN MARCH 1906, BEFORE THE START OF CONSERVANCY WORKS



MAP OF THE WHANGPOO, IN DECEMBER 1913, AND PLAN OF CONSERVANCY WORKS



SCALE 2000 FEET = 1 INCH.



DRAWING NO. M1

KAOW CREEK

18 FT

18 FT

12 FT

L.L.W.

MIDDLE

18 FT

BLACK POINT

18 FT

12 FT

L.L.W.

TUNG KOU CREEK

L.L.W.

HSI KOU CREEK

18 FT

12 FT

18 FT

POINT

L.L.W.

N

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CONSERVANCY WORKS EXECUTED 1906-1913

--- 12 FEET DEPTH CURVE (BELOW LOWEST LOW WATER)

18	30	35	35	35	35	35	35
24	35	35	35	35	35	35	35

KAWOW CREEK

24 FT

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MIDDLE

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TUNG KOU CREEK

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HSI KOU CREEK

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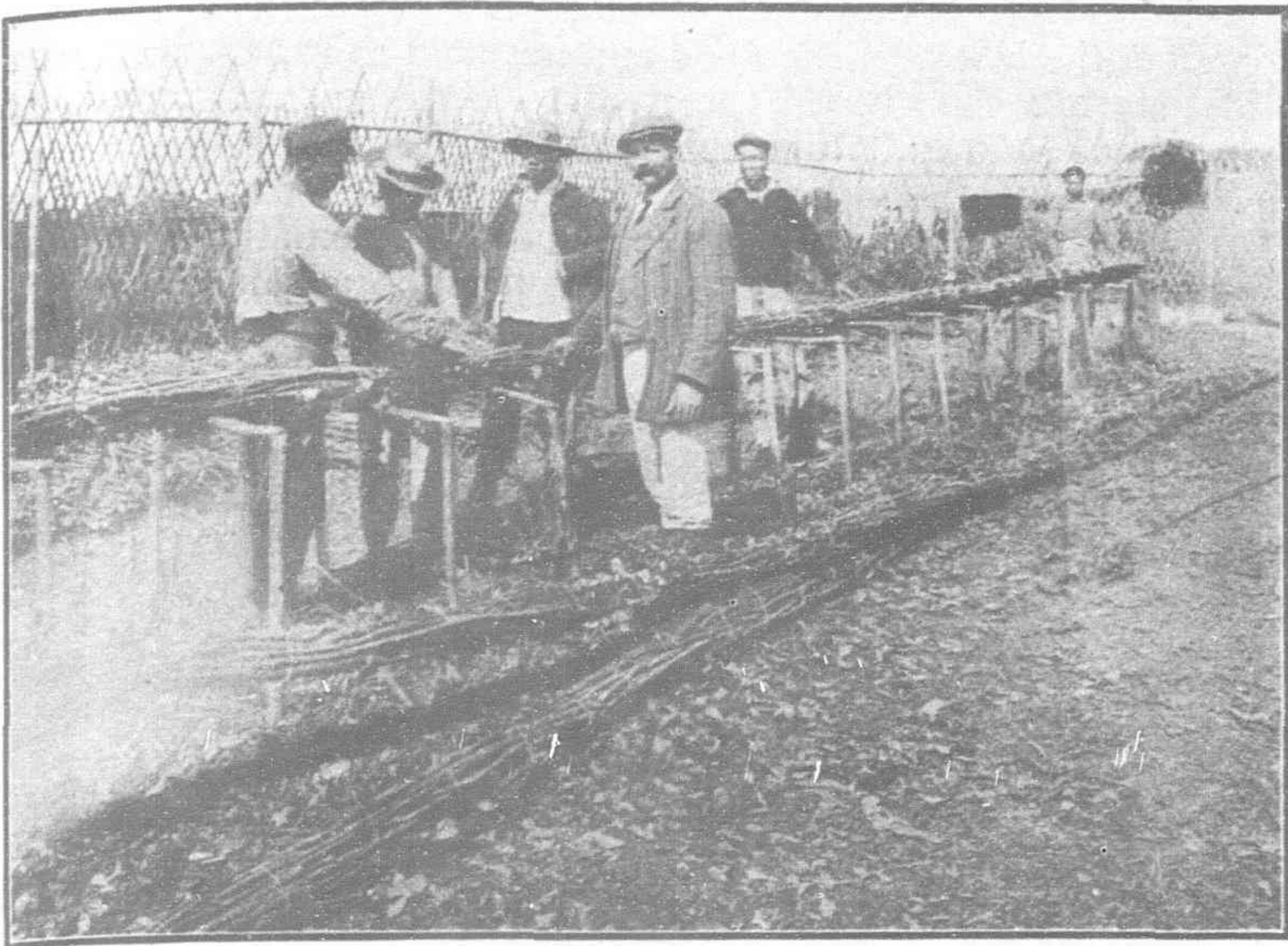
POINT

LLW

Alva Hildebrand

ENGINEER-IN-CHIEF

INCH.



Wiep binding for "Sinkstucks."

this: The navigation may be just as well served by dredging alone and that at perhaps only half the annual cost of the present complete scheme for the next 10 years. But the general deterioration of the river would be only partly checked, its courses would keep shifting and at the end of the 10 years the river would require just as much Conservancy funds as the first year. As elsewhere in nature there is nothing whimsical, accidental or anomalous in the general course of the developments of a river. From many reasons but chiefly on account of the restriction of its entrance, growing worse by accumulation of Yangtze silt, the lower Whangpoo at present is in a state of diminution. The results of previous conservancy works have alleviated the greatest direct local inconveniences but the scheme not being completed, the cross-sectional areas in the entrance are smaller than ever before during the last decades. The 'shrinking process' is here and has come to stay if the regulation is not continued and kept up, uniting the natural forces at disposal and training them to combined vigorous resistance.

Continuous dredging ad infinitum all over the river is obviously always an available palliative, but effects in each case only a temporary suppressing of the ever increasing and multiplying symptoms of the river's consumptive disease. To rational treatment and cure leads only one royal road: continued training and regulation."

During the early part of 1912 things, however, became critical. The river deteriorated in several places, and strong representations were made to the Government to allow a scheme, put forward by the Shanghai General Chamber of Commerce to be put in operation. Finally in April 1912 a provisional agreement was made between the Chinese Government and the representative of Foreign Powers, providing for a reorganisation of the Conservancy Board and for the raising of funds by special taxation for the carrying on of conservancy work. The reorganised Board,* consisting of the Commissioner for Trade and Foreign

Affairs, Mr. Ivan Chen, the Commissioner of Customs, Mr. H. F. Merrill and the Harbour Master, Captain Wm. Carlson, held its first meeting on April 30. The collection of the conservancy tax—3 per cent. of the Customs duties on imports and exports and $1\frac{1}{2}$ per mille of value of duty free good—was begun on May 15, and the proceeds have averaged about Sh. Tls. 42,500.00 per month up to the end of 1913, an amount which seems to assure the carrying out, in due time, of the project for the continued regulation of the Whangpoo, as submitted to the Board in October 1911 by Mr. von Heidenstam, the Engineer-in-Chief.

During 1912, up to the time of the reorganisation, not much new work could be done in the river. The longitudinal dam running parallel with the Woosung Forts Jetty, on the right side of the river, below Pheasant Point (the construction of which had been going on with many difficulties during 1911), was finally completed by the placing of the last stone ballast; and the three cross-cribs, forming part of this same group of training-works, were also finished.

After the reorganisation of the Board† in April and the improvement of its financial status, conservancy activities on a larger scale were again resumed and the Engineer-in-Chief's project for the continued regulation of the river was formally adopted for execution.

The staff was considerably increased, a general reorganisation of the technical and administrative departments carried out, and a set of service rules and regulations and instructions for employees promulgated.

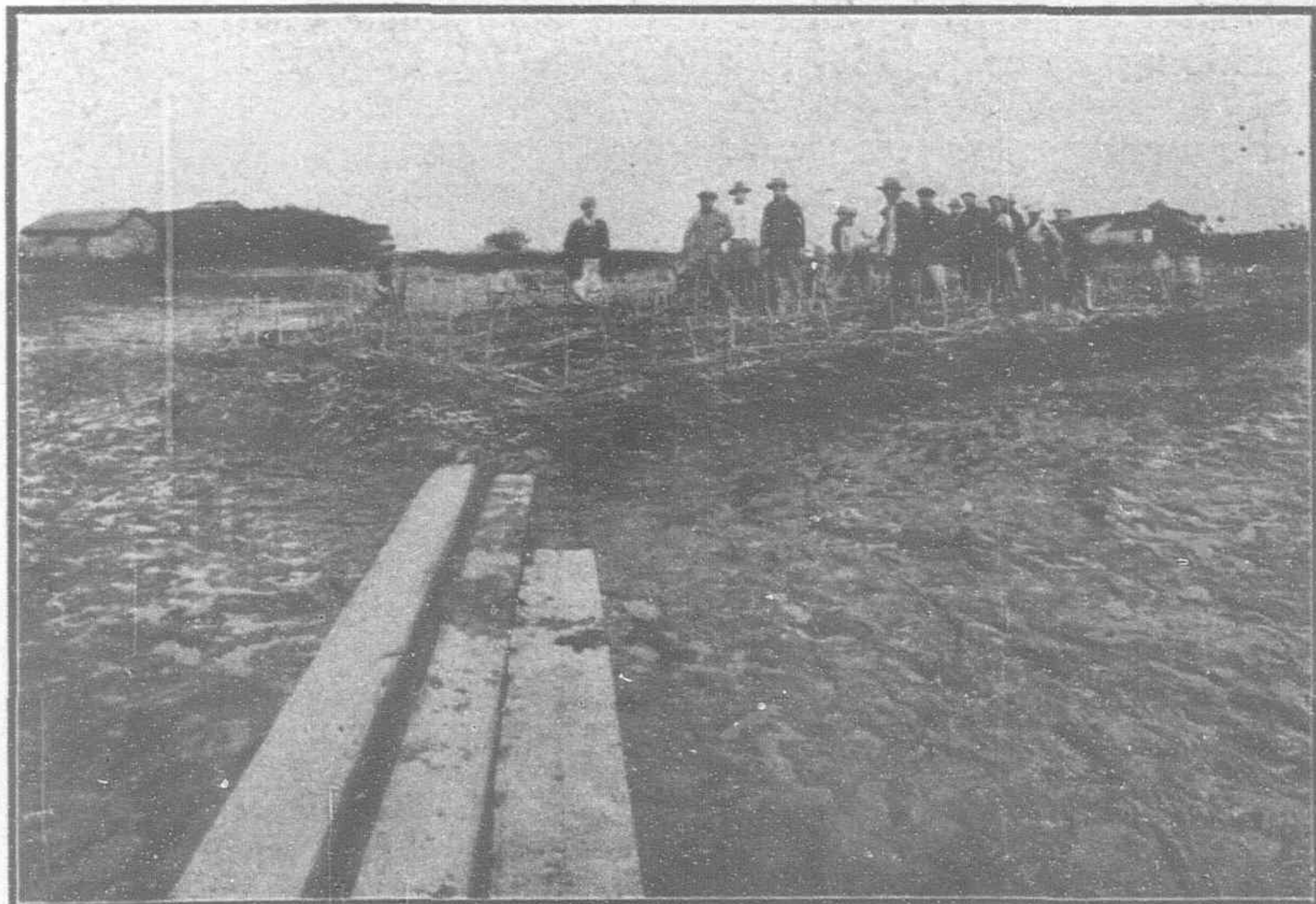
A dredging contract of 4 million cubic yards (barge measure) was made with a Dutch firm, the Netherlands Harbour Works Company, who were the only tenderers in response to the Board's invitation for tenders published on May 1.



Construction of a "Sinkstuck."

(Japan) and Mr. Y. C. Tong representing the Chinese General Chamber of Commerce.

†A Consultative Board is formed by one representative for each of the five leading shipping nations appointed by their respective Minister in Peking and one representative for the Chinese Chamber of Commerce. This Board at present consists of Mr. J. N. Jameson (America); chairman, Mr. A. M. Marshall (Great Britain), vice-chairman, Capt. H. Schellhoss (Germany), Mr. L. Bridou (France), Mr. A. Ishii



"Sinkstuck" ready for towing to place of destination.

*The Board of Directors now consists of Mr. Yang Tcheng, Special Envoy for Foreign Affairs, Mr. F. S. Unwin, Commissioner of Customs and Captain Wm. Carlson, Harbour Master.

Two dredgers started in July with the most urgent work on the programme, i.e., the cutting away of Pheasant Point, required in order to make the river conform with the normal lines laid down, and thereby promote the tidal scouring action. Later on, work was started with a third dredger, which was in November transferred to the Upper Astræa Channel, at the so-called De Rijke's Point, where the navigational channel had continuously narrowed. The cutting away of Pheasant Point includes the

carried only to a height of ordinary low water in order not to obstruct the inflow of the flood and to retain as far as possible the tidal storage capacity of the river. At the end of 1913 these works were nearly half completed.

A regular hydrometric survey-service was started in 1912 and there are now in the river six automatic tidegauges, working excellently and rendering possible a valuable control of the tidal action; regular hydrometric current and water



Dredging and Reclaiming at Pheasant Point.



Pheasant Point Protection.

excavation of the larger part of the present site of the Quarantine Station. In order to create a new site for this station, and at the same time effect an improvement in its sanitary condition which, on account of the very low elevation (about ordinary high-water level) of the ground, has been far from satisfactory, the Conservancy Board decided to reclaim a foreshore area just about the Point and raise it by pumping up dredged material to a height of about 6 feet above the level of ordinary high water.

The depositing of the matter dredged took place by pumping in the difficult reclaimings, by dumping and pumping in the old Ship Channel and by dumping in the Yangtze, half a mile north-west of the Woosung Forts Jetty. During 1913 the dredging was continued with 3 dredgers, 1 pumping station, 6 tugs and 12 barges at Pheasant Point, and also in the Astræa Channel which was deepened in its central part and widened in its uppermost part. On December 31, 1913 an amount of 3,310,617 cubic yards had been dredged since the start in July 1912. Several valuable reclaimings have been made along the banks.

The first training-dams to be built under the new régime were two cribs above Kajow Creek which were finished in 1912. During 1913 the important training dams in the section of the river between Cosmopolitan Dock and Black Point on the left bank were started. These works consist chiefly of longitudinal training dams parallel to and inside the Normal Line and are

measurements are taken at each characteristic tide. The whole upper river has been surveyed, sounded and mapped, as well as one or two of the main tributaries.

Standard cross sections have been established at the critical and characteristic points between Woosung and the Arsenal as well as in the Upper River and are all sounded regularly half-yearly (once in April after the scouring season, and once in October after the silting season), so that the general state of the river is carefully diagnosed twice a year.

General sounding maps over difficult reaches of the river are made regularly as needed and are supplied to the Authorities concerned.

The general state and regimen of the river, although in several reaches still far from satisfactory, has during the last two years considerably improved.

The general scouring force of the river has been uniformly maintained and at Pheasant Point and in the central Astræa Channel proved itself capable to maintain better than expected the results achieved by dredging.

With the exception of the reach off the Wayside Bar in the Harbour, where the depth is only about 23 feet in mid-channel, the fairway has everywhere a depth of 24 feet, at low water of extraordinary spring tides, over a width of from 500 to 600 feet.



Sinking Brushwood Mattresses.

Looking towards the future, there are still many large works to be done, before the Whangpoo can be considered regulated, and before it will have reached the aim of every river-regulation, i.e., as far as possible self-maintaining state. Such are, for instance, the training-works on both sides of Pootung Point, the large dredging cuts opposite Cosmopolitan Dock, at Pootung Point, Chinese City, etc., amounting to several million cubic yards, which all are planned for in detail. In order to deal with the dredging work, including facilities for wharf-owners to get increased depths at their wharves by dredging at cheap rates, the project of the Engineer-in-Chief further provides for the purchase of a dredging plant to be operated by the Board. If the work is allowed to proceed steadily and no tidal waves or other extraordinary events overthrow all human calculations, there seems adequate reason to hope that within a few years the Whangpoo up to the Upper Harbour Limit will offer navigators a through fairway of more than 24 feet at Lowest Low Water over a width of from 600 to 900 feet.

In a speech before the Shanghai Saturday Club on May 17, 1913, Mr. von Heidenstam, however, pointed out a couple of facts, which will have a very great influence on the future of Shanghai as a port. After speaking of the work being and to be done in regard to the river he said:—"The question of the deep-water approach

to Shanghai is, however, not entirely solved thereby. An ocean-going ship bound for Shanghai must before entering the Whangpoo pass the so-called Fairy Flats in the Yangtsze Estuary, 25 miles below Woosung, where there is only 17 feet of water at Lowest Low Water at present. To deal efficiently with the Yangtsze Estuary involves, however, either very large operations or otherwise large risks, as an arm of the river, where a smaller scheme might be carried out may entirely upset the scheme by taking another course. Any extensive improvement of the Yangtsze Estuary will probably prove to be an expensive undertaking, but no doubt such work has to and will come."

The success of the Whangpoo and Haiho conservancy works under experienced foreign control should inspire in the Government a determination to adopt a comprehensive scheme for the regulation and improvement of all the waterways of China. A good beginning has been made. The Hwai River Agreement is another big step forward. But there remains much to be done. Other rivers that periodically spread devastation and death have to be controlled, harbors that are now shallow and shipless and unsheltered have to be deepened and protected, and canals that have become choked through neglect have to be restored until they once more arteries of commerce. When these great works are taken in hand an era of abiding prosperity will have begun in China.

SUMMARY OF EXPENDITURE, 1906—1913.

Year.	Interest on 4½ Million Taels Loan.	Staff, Plant, Maintenance, Etc.	Dredging by Contract	The Woosung Outer Bar Training Works, by Contract.	Training-Works and general Works under own Administration.	Yearly Total.
	Sh. Tls.	Sh. Tls.	Sh. Tls.	Sh. Tls.	Sh. Tls.	Sh. Tls.
1906	—	100,601.62	—	—	9,391.31	109,992.93
1907	—	178,019.34	—	46,946.05	300,830.13	525,795.52
1908	—	201,267.51	625,000.00	766,821.47	680,788.27	2,273,877.25
1909	65,625.00	208,697.59	507,614.00	675,940.70	464,318.30	1,922,195.59
1910	170,625.00	172,819.47	770,274.61	487,460.52	388,637.12	1,989,816.72
1911	269,062.50	185,695.36	375,000.00	39,955.96	41,499.94	911,213.76
1912	—	84,052.35	163,888.19	—	37,017.28	284,957.82
1913	—	141,395.99	560,487.22	—	58,439.29	760,322.50
Total	505,312.50	1,272,549.23	3,002,264.02	2,017,124.70	1,980,921.64	8,778,172.09

AMERICAN-PHILIPPINE COMPANY

Despite the pessimism in some quarters about the future of the Philippines it is evident that capital is not quite so timid as it was said to be. The American-Philippine Company, which has a capital of P. 1,000,000 has organized the Visayan Refining Company with a capital of G. \$500,000, to engage in the production of coconut oil. The plant is to be erected near the town of Cebu, and will have a capacity of 75 tons of oil per day.

The vice-president and construction engineer of the American-Philippine Company, Mr. David Fox, and Mr. Edward B. Thompson, who is to superintend the erection of the plant are now in the Philippines, and it is hoped that in a year's time the Visayan Refining Company will be in full operation.

HWAI RIVER CONSERVANCY SCHEME

Writing from New York under date March 19 Mr. C. D. Jameson, stated that Messrs. J. G. White & Co. had taken over the entire work in connection with the Hwai River Conservancy scheme upon a percentage basis. Messrs. J. G. White & Co. will furnish the money required to carry out the work. Mr. Jameson hoped to return to China in June next with some of Messrs. J. G. White & Co.'s engineers to study the floods if such should occur this year.

UNITED STATES STEEL PRODUCTS CO.

The Manager of the Asiatic business of the United States Steel Products Company, Mr. George C. Scott, has been making a thorough investigation of business conditions throughout the Far East. The company has for a long time been operating largely in China, Japan, the Philippines, the Dutch East Indies, etc, from its Shanghai office and a very large business, particularly in steel rails has been developed. Recently orders for 11,500 tons of steel rails were secured by the Company from the Chinese Government. This, however, is only one branch of the Company's activities. As its name implies it handles steel products of every kind. One of its specialties is the triangle wire mesh for reinforced concrete pavements and roadways. Most American cities have realized that reinforced concrete pavements and roadways afford many desirable features, namely: minimum original cost and maintenance, durability, tractive resistance, foothold and sanitary qualities. The triangle wire mesh, it is claimed, has solved the "good roads" problem.

In our last issue we published translations from the Chinese Press of the Hanyehping Loan Agreements and the new Mining Regulations for China. By a regrettable inadvertence credit for these translations was not given to the *Peking Gazette* in which the Agreements and Regulations appeared. We hasten to repair the omission.

THE SOUTH MANCHURIA RAILWAY CO.

WORKSHOPS AT SHAHOKOU

At Shahokou near Dairen the South Manchuria Railway Company has railway workshops, which for completeness of equipment can compare with anything of the kind elsewhere. The company was determined that the question of expense should not prevent the establishment of shops that could not only cope with all the requirements of their own railway, but be capable of undertaking work from outside. With their equipment the workshops entailed an outlay of \$2,946,000 U. S. currency. The building material and machinery were purchased from Great Britain and these purchases amounted to nearly \$2,000,000 U. S. currency. But as most of the rolling stock of the railway was purchased in America, much of the tool equipment is of American manufacture. The work of construction and equipment was completed in November, 1911. From a report on these workshops by Mr. Albert W. Pontius, American Consul at Dairen we take the following facts:—

GENERAL ARRANGEMENT OF PLANT

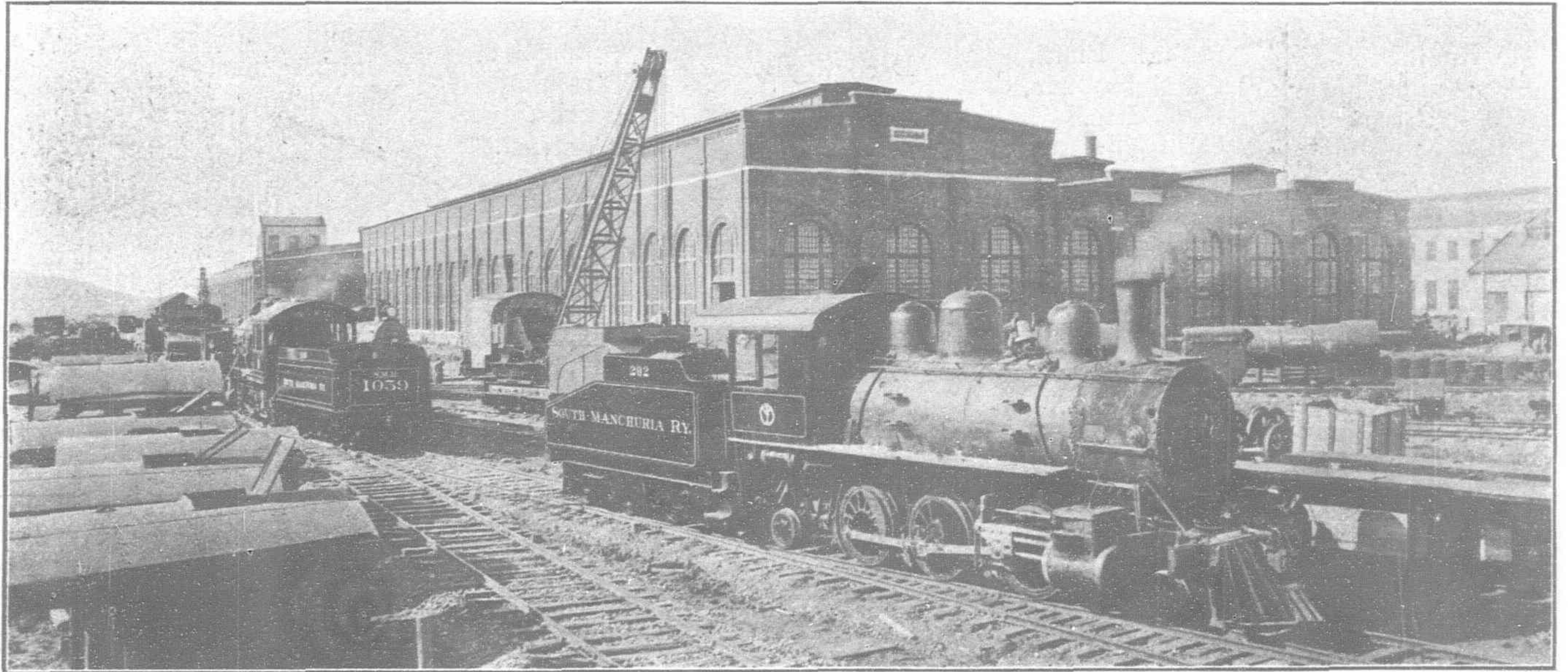
The area of the workshops and residential colony is about 400 acres. In the residential section of 200 acres are 695 houses for the staff and laborers, 12 houses for tradesfolk, a hospital, a

doors. The locomotive and machine shop, the boiler shop, and the blacksmith shop are steel skeleton structures, with steel roof trusses, inclosed in independent brick walls. The roofs of the locomotive and machine shop and the blacksmith shop are covered with grooved and tongued Oregon pine boards and laid with four thicknesses of tarred felt, cemented with pitch, and nailed down to the roof boards. Finally a coating of pitch was spread over the felt and covered with gravel. Both these buildings are provided with skylights.

The power house is equipped with three batteries of water-tube boilers. The chimney for the boiler plant is built of steel plates and stands upon a brickwork base. It has a height of 157 feet and a diameter of 9 feet at the top and 16 feet at the base. Coal is received by a hopper and passes then through a valve into the automatic filler, which fills the buckets of the endless chain-bucket conveyor for dumping into any of the six overhead coal bunkers. The coal conveyor is capable of handling about 20 tons per hour. The greatest diameter of the outgoing steam main is 9 inches and that of the incoming return main for water condensation is 4 inches.

HEATING, LIGHTING, AND FIRE PROTECTION SYSTEMS

The "Stanlock" heating system is in use. The steam consumption is estimated at 43,800 pounds per hour and the power for driving the motor fans at 38 kilowatts. A feature of the



Exterior View of the South Manchuria Railway Company's Workshops at Shahokou.

primary school, a post and telegraph office, 3 small public baths, and a club house. All the houses are lighted by electricity, and the better class homes have hot-water heating systems. The colony is equipped with water supply and drainage systems. According to the latest census it has a population of 2,600 Japanese and 996 Chinese.

The ground space covered by the shop buildings amounts to nearly 11 acres. They are a sufficient distance apart to have good natural lighting and are so grouped as to minimize the distance over which materials and parts must be carried. The shops can repair at the same time 27 locomotives, 36 passenger, and 130 freight cars. The plant includes the following: Locomotive and machine shop; boiler shop; blacksmith shop; foundry; pattern shop and foundry stores; power house; general stores; truck, wheel, and brake shop; wood mill and freight car shop; cabinet, upholstering, and passenger car shop; paint shop; timber store-room; timber-drying kiln; train lighting equipment shop; testing laboratories; fire station; pumping station; 70-foot turntable; 75-foot traverser; and general office building.

CONSTRUCTION—POWER HOUSE

Most of the buildings are fitted with patent roller shutter metal doors, and in some cases with additional sliding fireproof

heating service is the draining of the steam risers by means of special U-shaped water loops, connecting the bottom of each riser with the return pipe. There are 46 radiators, with a radiating surface of 2,645 square feet.

The lighting of the workshops and the yard is accomplished by 60 flame arc lamps of 1,200 candlepower each, 601 tungsten lamps of 100 candlepower each, and 39 tungsten lamps of 25 candlepower each. These lamps are lighted by 25-cycle 100-volt alternating current transformed from the 2,100 volt main, transmitted by the central power house at Dairen.

For fire protection the dry pipe system of the Grinel patent automatic water sprinklers has been installed in the five buildings in which combustible materials or articles are handled or stored. A total of 2,266 sprinkler heads has been installed, the installations being controlled by alternate wet and dry valves. Automatic alarm gongs operate instantaneously with the fusing of the sprinkler heads. There are two sources of water supply. One "Underwriter" steam pump is capable of pumping water at the rate of 1,000 gallons per minute into a cast-iron tank holding 7,500 gallons. This tank is at the top of a steel structure 80 feet above the ground. The fire brigade station is equipped with a light steam fire engine, a hose cart, and six 100-foot lengths of hose.

THE FAR EASTERN REVIEW

COMMERCE :: ENGINEERING :: FINANCE

Editor: W. H. Donald.

Associate Editor and Manager: F. Lionel Pratt,
5 JINKEE ROAD, SHANGHAI, CHINA

Telegraph Address: Farview, Shanghai

A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to
the Industrial Development and Advancement of Trade in the
Philippines and Far Eastern Countries

HEAD OFFICE,
5 Jinkee Road, Shanghai, China

MANILA OFFICE,
Messrs. ELSER AND CALLON
Kneedler Buildings

PEKING OFFICE,
Russo-Asiatic Bank Building, Legation Street

UNITED STATES,
J. ROLAND KAY CO.
Advertising Building, Chicago

GREAT BRITAIN:
SOLE ADVERTISING AGENTS
WALTER JUDD, LTD.
5 Queen Victoria Street, London, E.C.

GERMANY, AUSTRIA and SWITZERLAND
RUDOLF MORSE ADVERTISING AGENCY
SOLE ADVERTISING AGENTS:
Jerusalem Str. 46-49 Berlin, S. W. 19

SUBSCRIPTION RATES: Philippines, United States, Canada, and Mexico,
\$2.50 U. S. C. per year. To all other countries in the Postal Union, Mex.
\$7.00 per year, postage \$2 Mex. extra. Single copies 25 cents, U. S. C. or
75 cents, Mex.

ADVERTISING RATES will be mailed on application.

ENTERED AT THE U. S. POSTAL AGENCY, SHANGHAI, CHINA,
AS SECOND CLASS MATTER

SHANGHAI AND MANILA, APRIL, 1914

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RAILWAY MANAGEMENT IN CHINA

Divergent opinions concerning the management of the Shanghai-Nanking railway have recently been expressed in the daily press, the difference of opinion being due to an attempt to measure the results of the management of the line from certain statistics obtained from different sources. On the one hand it was maintained that the figures representing the annual deficits of that road were a sure sign that the road had been badly managed, and on the other hand it was argued that the gradual reduction of such losses by the annual increase of gross earnings was a proof equally conclusive that the road had been well managed. While admitting that both sides have some reasons to support their point of view, it is well to mention that in the matter of such a complex enterprise as a railway it is often misleading to judge the management of a line simply by the increase of gross earnings or by the financial deficits during a short period. In the first place, traffic on any reasonably placed railway, the world over, almost always increases from year to year, and hence railway earnings must also increase accordingly. In a country like China, however, where people are accustomed to other ways of transportation, it is but natural that railway traffic is less in the first two or three years than during later periods. The habits of the people, the prosperity of the country, and many other factors, which are beyond the control of the railway management, all combine to affect the traffic and the amount of the receipts of any railway in the country.

Hence it is easy to see that the earnings of a line may gradually or even suddenly increase in spite of an ordinary or even poor management. This is especially true when a short period is considered. Therefore, the figures relating to the steady increase of earnings, while in a way indicating the growing prosperity of the line, do not necessarily prove the efficiency of the management.

On the other hand, neither do the annual deficits of the line prove that the road is badly managed, for there are equally as many factors outside of the control of the management which may lead to such deficits. There is the difference in the location of the line which affects constantly both earnings and expenses, there is the difference in capital cost which in turn calls for differences in annual interest charges, there is the length of the line which affects the economy of operation, and there are a hundred and one other factors which determine the profit or loss of a road. History has shown that two lines, while being equally well managed, may often produce entirely different results. Indeed, if a line is favorably located, it may enjoy seeing traffic flow to it in abundance, so to speak, without any special effort on the part of the railway, in which case money can be made by a "sleeping" management; while on the other hand if a line is badly located and confronted with keen competition, it may find it difficult to make both ends meet in spite of a first-class management. Therefore, it is well to emphasize that to measure the success or failure of the managements of the different lines by simply comparing their receipts or the amounts of profits and losses which appear in their ledgers, often would be doing injustice to the managements. This is especially true, when the figures are not obtained by a uniform method and hence may represent entirely different things.

These facts lead us to say that in comparing the efficiency of the managements of the different railways in China, we must have uniform and more accurate and detailed statistics than what are available, and we must also take the local conditions and the facts of a fairly long period into consideration, before we can hope to do any justice to the railways in our comparison. Under the existing circumstances, where the systems of accounts and statistics of the different railways are all different, and where the system of each line itself is often changed from year to year, all comparisons and criticisms are liable to do more mischief than good. In this connection it is satisfactory to notice that the Ministry of Communications has established a special Commission for the unification of the different systems of railway accounts and statistics,* and has wisely placed this Commission under the supervision of Mr. Yih Kung-chao, the Director-General

*See FAR EASTERN REVIEW, April, 1913.

of Railways, and under the immediate charge of so earnest, progressive, and capable a man as Dr. C. C. Wang, Assistant Director of the Peking-Hankow railway. What is gratifying, too, is the selection as adviser of so able, learned, and experienced an economist and statistician as Dr. H. C. Adams. By looking over the names of the members of the Commission, we notice among them officials interested in accounting and financial matters of the Ministry of Communications and also the chief foreign accountants of all the important railways in China. This immediately leads us to look for good results, for it is only by careful examination and open deliberation as well as all round co-operation, that such an important and difficult problem as the unification of the different established systems may be brought about; and it is only by entrusting the matter in the hands of experts that good results may be obtained. And so far as we know this is the first time in China's railway history that native and foreign experts have been called together to consider and devise rules for solving an important problem in a systematic manner. It is certainly a good example which may help in solving numerous other technical questions.

In spite of the great difficulties which appeared insurmountable at the beginning, we understand that the Commission has just finished its fifth session and has held some fifty meetings. A uniform system of accounts for the use of the lines under construction will soon be presented to the Ministry for enforcement, while the whole programme of the Commission will probably be finished before winter, thus doing work in one year which took other countries at least three years. We look forward with great expectations and hope this quiet but important and lasting piece of constructive work will be allowed to be completed, and that an equally efficient organization and proper men will be found to take care of its enforcement, so that before very long the world may have some up-to-date statistics and other necessary information upon which to judge the railways of China. At present China suffers internally by being unable herself to determine accurately how her railways are doing, and externally her credit is not what it might be owing to the inability of foreign experts to arrive at a correct estimate from the varied methods of accounting in vogue. China stands to reap valuable benefits from a proper application of the recommendations of this commission.

GOVERNOR-GENERAL HARRISON SPEAKS OUT

A "straight talk" by the Governor-General of the Philippines to the business community at Manila, has considerably cleared the air and promoted a distinctly better feeling in business circles. The occasion was an informal "smoker" at Malacanán palace at which practically the whole of the business community was represented. After assuring his hearers that he was with them in anything and everything Mr. Harrison went on to say:—

- "I am an American and there is nothing in the world that I am so proud of as this fact. Every drop of blood in me is American, and gentlemen, I want to assure you that in everything that may happen I am one of you.
- "I do not intend to make a political speech tonight and furthermore the political status of the Philippine islands cannot be settled here. The congress of the United States is the supreme authority to settle this question and I sincerely hope with you that the status and the limitations of the Philippine question, which is a world-wide question, will soon be definitely settled. The former administration has failed to do so and then, as to-day, you businessmen suffered from the same uncertainty as you do now. The executive has no power to alter this condition. He can only advise you to be hopeful and cheerful as to the future.
- "Conditions in the islands are excellent, agriculture is in a state of prosperity such as it has never enjoyed before, and agriculture is the basis of all prosperity.
- "There is another point about the business depression. It is not confined to the Philippine islands alone, it is world-wide. I urge you to look beyond the limits of the Philippines, to find the reasons for the present tightness in the money market. The United States is just recovering from a financial stringency. Germany had a year of bad business, followed by France's slump in commercial prosperity. A foreign minister about a year ago told me that within a few months from the time I spoke to him \$500,000,000 worth of American securities would be

unloaded to meet the eventualities that might arise out of the Balkan situation. Just think of it, \$500,000,000 which the American market had to absorb. So you can readily see that when you look beyond the Philippines you will understand present conditions.

- "As a matter of fact the local situation has been better than could reasonably be expected under present conditions. After all, credits depend largely on sentiment and I should advise you to look at things from the cheerful side. As I said before, I am with you in anything that I or my colleagues on the commission can do to further your interests. I can assure you that we all desire your utmost prosperity.
- "I am now here six months. The law compels the chief executive to co-operate with the legislature and for that reason I found such an amount of work before me that I had to forsake practically all social and recreative activities. It was not that I did not want to meet you before; it was a physical impossibility. You are many and I am only one, and could I sub divide myself into ten persons I could not grant all the interviews that are requested of me.
- "I assure you that I am profoundly grateful to have had this opportunity of meeting you all to-night and I hope that in the future misunderstandings between us will be barred. In the east, it seems everything is rumor. Something starts as a rumor, lives as a rumor, and dies as a rumor without having had any foundation in fact. Be cheerful, and eventually all will be well."

This straightforward address was extremely well received by the guests. Suggestions had been made covertly that the Governor-General was quite out of sympathy with the legitimate aspirations of the American community. That such a charge was absolutely baseless was known to all unprejudiced people who had had an opportunity of learning Mr. Harrison's views, but there were many to whom such an opportunity had not offered. It is a plain statement of truth that the executive has no power to determine the political status of the Philippine Islands. Congress alone can supply the solution of this problem, though it may be assumed that the reports and recommendations of the executive must needs carry weight. That being so it was reassuring for the business community to learn that the Governor-General was in entire sympathy with them and had every desire for their prosperity. This may be taken to mean that he will recommend that whatever steps are taken in regard to the Philippines the rights of Americans in the Islands should be effectively safeguarded. The increased confidence Mr. Harrison's speech has inspired should go far towards restoring a normal condition of affairs in the local business arena.

THE NORTH CHINA OILFIELDS

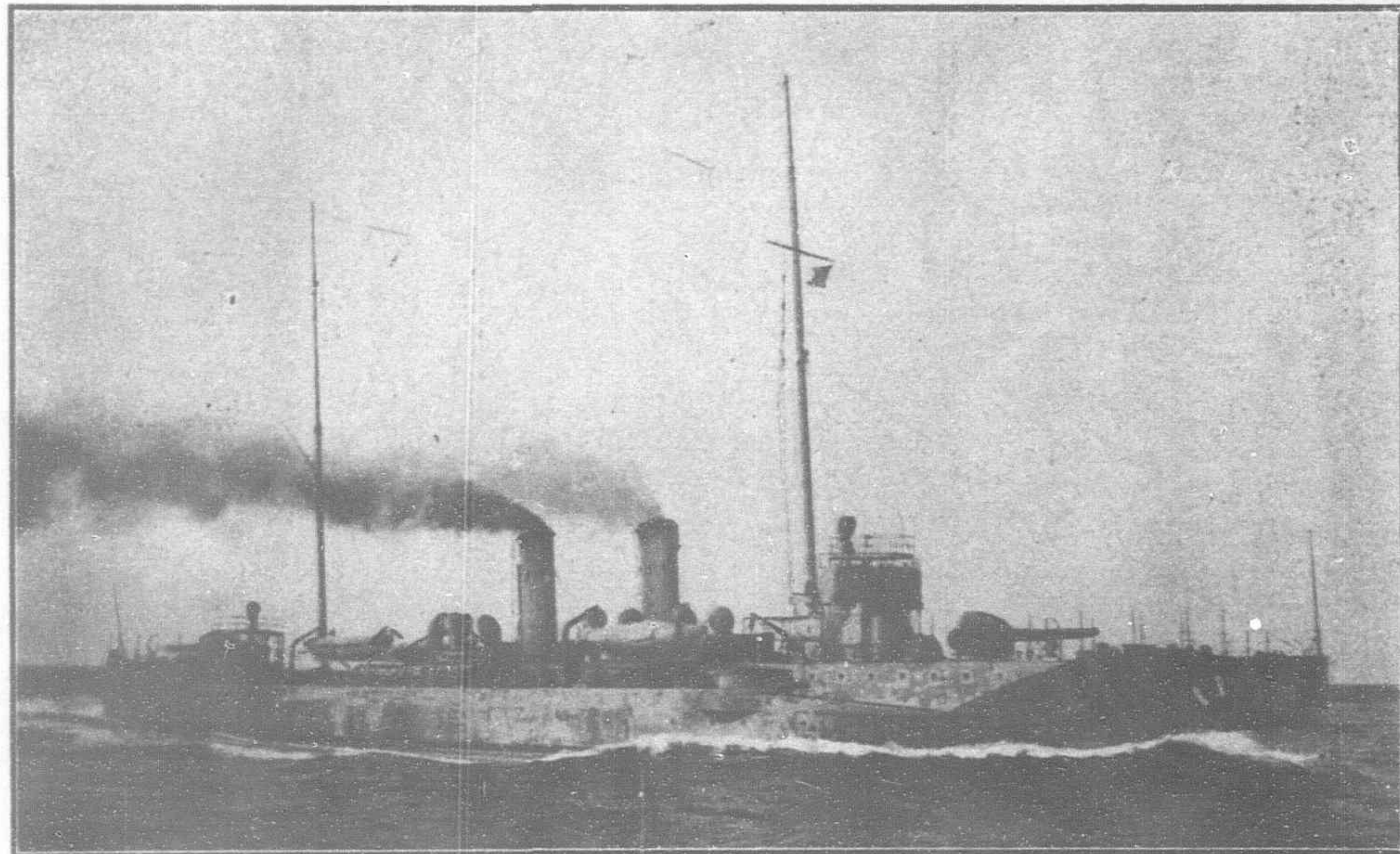
In certain quarters a tendency has been shown to doubt whether the Standard Oil Corporation of New York intended seriously to carry out the agreement made recently with the Chinese Government for the exploitation of the North China oilfields. An amply sufficient answer has been given by the arrival in Shanghai early in April of a staff of engineers and drillers. These men will proceed to the oil fields directly the preliminary reports of the experts who are investigating the oil deposits are to hand. It will be remembered that by the agreement the oilfields of Shensi and those near Jehol were to be investigated in the first instance. The experts proceeded to Jehol immediately the Agreement was signed. After completing their investigations in this locality they will visit the Shensi fields.

Another indication that the Standard Oil Company was thoroughly in earnest is afforded by the despatch of a special steamer with 1800 tons of drilling machinery to North China. The withdrawal of so many expert geologists and workmen from other work and the prompt provision of necessary machinery is a satisfactory proof that as far as the Company is concerned no time is to be lost in proving the value and extent of the oil deposits. If the prospects warrant it, it may be confidently assumed that equal celerity will be shown in starting active operations, and that China will have provided for her a new and increasingly valuable source of revenue. It is sincerely to be hoped that the investigations prove satisfactory, as the success of the co-operation of the Chinese Government with a foreign company with expert knowledge, wide experience and practically unlimited capital, would prove the forerunner of other arrangements of a similar kind. This is the one sane and safe method by which China can overcome her financial difficulties and develop the resources which would otherwise continue to be untouched. The riches that are hidden in the bosom of China

are hers, but hers as a trustee for the rest of the world. She is entitled to profit by their exploitation, but humanity in general has the right to benefit by their use.

THE SALT REVENUE

While the estimate of salt collections as set down in the revised budget is abnormally high in view of the conditions which have been obtaining in China of late, it must be gratifying, to the holders of bonds secured upon the salt revenue to know that a great improvement has been shown in the collections. Between May 21 and December 31, 1913, the total deposited in the banks representing the Reorganisation Loan bondholders was Mexican \$14,150,000, while in the first three months of this year the sum deposited was \$12,880,000, and the Ministry of Finance estimates that the end of the year will see fully \$55,000,000 in the banks from this source if some unforeseen difficulties do not arise. To serve all the loans secured upon the salt revenue the sum of \$16,250,000 will be needed in 1914, leaving a balance which will be utilised as part security for the loan of £15,000,000 now being sought by the Central Government. The reforms which Sir Richard Dane has suggested will be put into thorough effect if Mr. Chang-hu, the Head of the Central Salt Administration, can have his way. Already he has secured a striking improvement in collections, but he has a difficult battle to fight with the vested interests. Sir Richard Dane is personally hopeful that the Government will be able effectively to follow his advice, and if that can be done the question of security for the talked of loan need cause no worry to the bankers. The representatives of the vested interests have, however, held meetings to protest against the changes proposed in the collection of the salt dues and in all probability if the matter becomes acute a conference will be held to adjust the differences.



The Chinese Cruiser *Fei-Hung*, built by the New York Shipbuilding Company, on her trial trip.

POLITICAL RAILWAY MAP OF CHINA

We have had prepared a political railway map of China in five colours. This map shows all the railways in operation, under construction, contracted for, and projected. The use of colours to denote the political complexion of the lines makes plain at a glance the policy of the different Powers in relation to China. These maps can be purchased for fifty Mexican cents per copy at most booksellers or from the head office of the FAR EASTERN REVIEW, 5 Jinkee Road, Shanghai.

COLONIAL EXHIBITION AT SEMARANG

The Netherlands Consulate-General has sent us a prospectus of the Colonial Exhibition which is to open at Semarang, Java, on August 13, 1914 and close on November 15, 1914. The prospectus is attractively got up and supplies all information likely to be useful to intending visitors. There will be six sections of the Exhibition:—1. Colonial Government. 2. Agriculture and Horticulture. 3. Native Industry, Mining, Forestry, Hunting and Fishing. 4. Foreign Industry. 5. Commerce. 6. Means of Communication.

THE CHINA MERCHANTS' STEAM NAVIGATION COMPANY

GOVERNMENT VETOES NEW ISSUE OF SHARES

In the March issue of the FAR EASTERN REVIEW it was stated that the announcement had been made that the preliminary payment on account of the Hanyehping Loan arranged with Japanese financiers had been used to redeem scrip of the shares in the China Merchants' Steam Navigation Company owned by Sheng Hsuan-huai, and further that it was intended to dispose of these shares to Japanese interests. These reports naturally attracted the attention of the Government and an announcement was made by the Ministry of Communications in the following terms:—

On the 15th day of the 2nd month, the China Merchants' Steamship Navigation Company, Shanghai, held a special meeting. This Ministry then telegraphed to Intendent Yang, instructing him to attend and supervise the meeting, and ordered the said Company to report the proceedings of the meeting to the Ministry. Afterwards a petition was received to the effect that the meeting decided that the Company should be divided into two, namely, the Navigation and the Property Companies. The old share scrip shall be exchanged into two kinds of new scrip. For the Navigation Company new scrip to the amount of Tls. 8,000,000 will be issued. The holder of the old scrip of Tls. 100 shall be given for exchange Tls. 200 worth of new scrip. This new scrip shall be called "share of the China Merchants' Steam Navigation Company, Limited." With regard to those which have no connection with the navigation enterprise, new scrip of \$4,000,000 will be issued. For every old share of \$100, an additional new scrip of \$100 will be given. This new scrip shall be called, "shares of the Company for the Accumulated Properties in the Ports, etc."

It must be noted that in art. 6 of the regulations of the said Company it is provided that "Should there be sale, transfer or exchange of the properties of this Company, the sanction of the Ministry should first be obtained, before any transaction is made," and this rule has hitherto been kept. With regard to the present suggestion of the said Company to effect a change in the shares, and to divide the Company into two, this is a matter of great consequence. It has not yet been ascertained what is the real worth of the properties of the said Company, whether the fixed

value be a true one, or whether the Company has to meet any obligation of debts to the public. Moreover it must be considered whether it is right to divide the enterprise undertaken by the said Company into two. Therefore all the above points have to be investigated, so that care may be exercised in all its transactions.

Therefore this Ministry is now going to institute a joint investigation with the Ministry of Agriculture and Commerce. Before the decision of these two Ministries is made, no steps taken by the said Company will be considered as valid. Therefore before the sanction of our Ministries is given, should the said Company issue new scrip or should the said new scrip be sold or mortgaged to others, or be confiscated by others, they shall have no legal effect whether they be in the hands of Chinese or foreign subjects. Besides telegraphing to the above effect to the said Company, this notification is hereby issued for general information.

This notification was advertised in the foreign and vernacular press throughout China early in April. It is alleged that the proposed division of the Company into a navigation company and a property company was an astute move on the part of Sheng Hsuan-huai to evade responsibility to the Government if he disposed of his shares to foreigners. Another theory has been advanced, however. It is believed in some quarters that Sheng never had any intention of disposing of his shares to foreigners, but simply sought to alarm the Government so that they would buy out his interest.

PEKING POLITICS

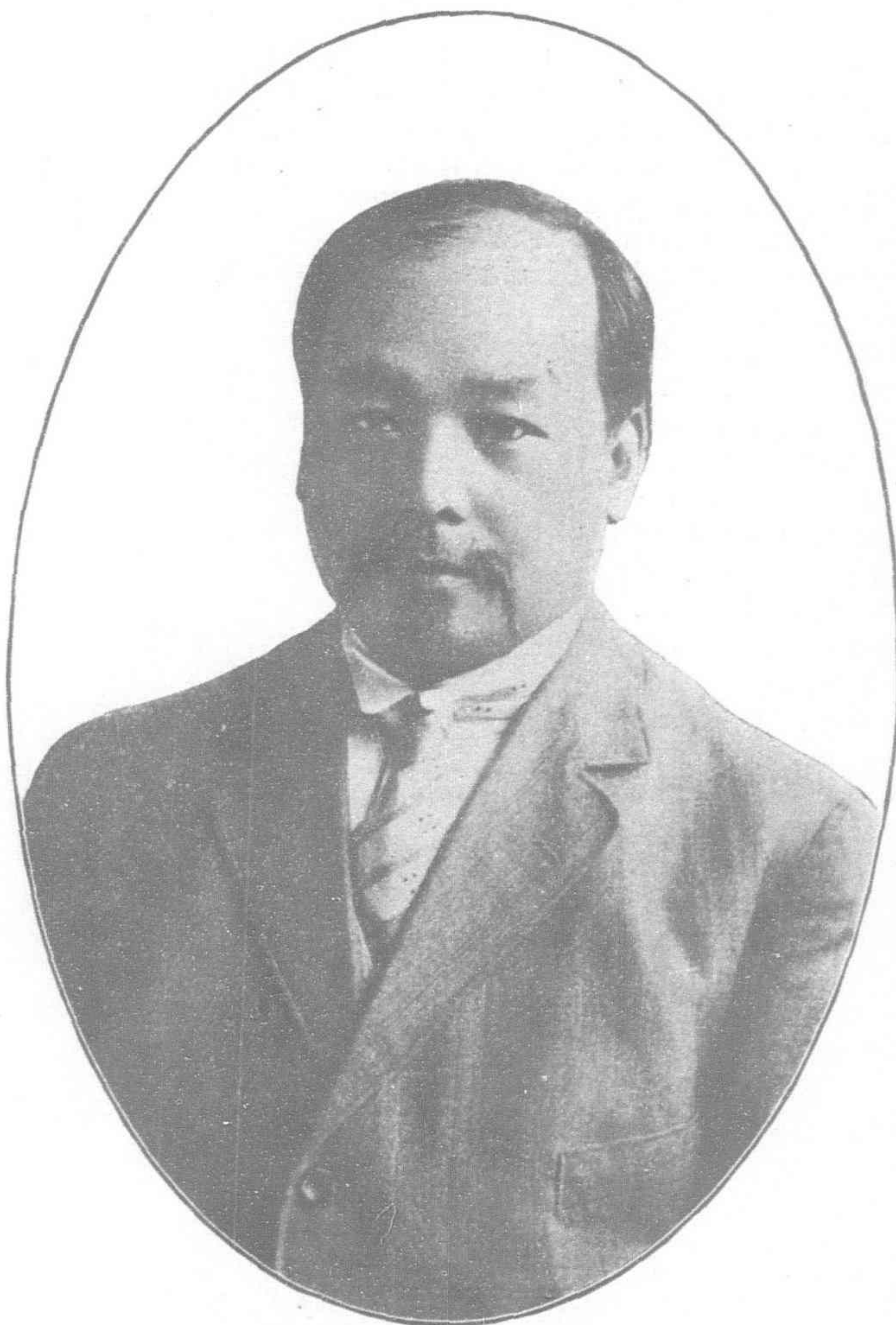
The battle royal which has been proceeding in the Presidential Palace between the military and the civil leaders to determine the fitness of those who claim the right to control the purse strings of China ends in a compromise. The determined set made by the military to remove the Chief Secretary of the President, Mr. Liang Shih-yi, from power was the most threatening onslaught that the all-powerful Cantonese has so far had to meet, and naturally enough a wide circle of officials evinced a keen personal concern in the affair, since the overthrow of Mr. Liang Shih-yi would mean the removal from office of the innumerable who depend upon his patronage. Foreigners, too, were closely interested, since the Chief Secretary is the possessor of the final voice in the majority of the affairs in which foreigners are concerned, and rightly or wrongly they entertain the idea that he does not always view with unprejudiced eyes the various matters which

acknowledged that he is a Chinese of great capability and daring; the type of ingenious man whom the President must have near him, and one who has a wide grasp of the affairs of the country. We do not propose to examine in any way the merits or demerits of the allegations made against Mr. Liang, but mention his survival in the campaign against him as an important factor in the game of political chess which has been proceeding of late in Peking.

The compromise which has been arrived at as a result of the failure of Mr. Liang Shih-yi's enemies to unseat him in the service of the President brings into public life again an ex-Grand Councillor, Mr. Hsu Hsih-chang, who will take the place of the Premier, under the Chinese title of Kuo-wu-ching, or, literally, Secretary of State. Mr. Hsu comes forward as a peacemaker between the conflicting groups, and his knowledge of the old style combined with his appreciation of the new will do much to restore quietude within the Palace confines. The advent of Mr. Hsu may, too, solve difficulties other than those created by the factions



Mr. Hsu Hsih-chang, Secretary of State.



Mr. Liang Shih-yi, Chief Secretary to President Yuan Shih-kai.

they are anxious to see consummated, and which he feels constrained to regard from a purely Chinese standpoint.

While the military party felt that they should dominate in the councils of the State, and at the same time should possess undivided control of the finance producing departments of the country, they were unable to carry sufficient guns to capture the positions in which the Chief Secretary has long been entrenched, despite the fact that the military consider themselves to be the main-stay of the President, and, in addition, had a large section of the press on their side. President Yuan Shih-kai, however, owes so much to Mr. Liang Shih-yi for valuable services in times of crises in the past that he could not willingly consent to his removal from office, and as the President's loyalty to those who have been near to him for lengthy periods is well-known it is inconceivable that Mr. Liang Shih-yi can be removed unless the President is in some way forced to consent. And if he did consent it is not likely that the military party could produce for the President any man with a tithe of the ability that his old Chief Secretary possesses. Whatever may be the character of the charges levelled or substained against Mr. Liang Shih-yi it is generally

in the Palace. With his acceptance of power may begin the organised attempt at government for which the country and the world have been patiently waiting ever since the revolution. A Chinese paper recently remarked that for the past two years "the country has been in the storm and the people have been in the wilderness," and while these calamities have been ascribed in the past to the political ambitions and machinations of the so-called inexperienced students of political economy, they should now be removed since the experienced men of the Ching Dynasty have again come back to power.

With Mr. Hsu Hsih-chang it is fairly certain that Mr. Liang Shih-yi will work eventually in affable concord, though an attempt was made to swallow up the Presidential Secretariat in a newly-created body known as the Cheng-shih-tang, or "Government Council," an organisation very similar to the Grand Secretariat of the Ching Dynasty. Mr. Liang steadfastly opposed such a move, however, and succeeded in frustrating the attempt to limit his influence in this manner. He remains outside the pale of the Cheng-shih-tang, and is still responsible only to the President, dominating, as before, the Ministry of Communications, and other Boards. His enemies will naturally continue to work for a

curtailment of his energies, but those who know China and the Chinese will find it difficult to believe that Mr. Liang's long experience of the intricate game of Chinese politics will fail him in this important crisis.

As the Secretary of State Mr. Hsu Hsih-chang, will, however, bring another change in the Cabinet, but there is a likelihood that the new officials will only be appointed upon acceptance by Mr. Liang Shih-yi, in which fact only will be the solution of the



Mr. Sun Pao-chi, Acting Premier and Minister of Foreign Affairs.

present difficulties, short, of course, of the retirement of Mr. Liang himself. Mr. Hsu has many points in his favor when the circumstances of the moment are considered. He is an old henchman of the President, is a Hanlin—one of the flower of the Chinese literati—and, in his early associations with President Yuan Shih-kai in the creation of the modern drilled army, was superior to the military officers who now hold the highest ranks in the army, a point of great importance when the Chinese reverence for their masters is remembered. Likewise he is about the only old official whom the President could call to his side who can command the respect of other old officials whose services will be enlisted. Thus he will be in the unique position of being able to obtain respect and a hearing from both the military and official leaders. Judged by the standards of the old regime Mr. Hsu Hsih-chang is a capable man. He has had the opportunity of obtaining wide experience in administration. He has occupied the first position in almost every Board in the Ching Dynasty, as well as having been one of the Grand Counsellors, later becoming the 'Tai-pao, or "Protector of the Emperor's person," a position ranking somewhat higher than the office known as the "Guardian of the Emperor." To the Young China party, however, Mr. Hsu Hsih-chang is the personification of what is reactionary, and they believe that he will bring back into power the out-of-date ideas which they imagined the revolution had thoroughly extirpated. The future will show, of course, what type of official is better for the immediate good of China. It has been declared that the Young China party has been tried

and found wanting, and now it is the untrammelled turn of the old to show that after all they alone know how to govern. The great masses of the Chinese people will be quite content to have the old return to power if peace is given the country and trade and commerce are permitted uninterrupted freedom, and foreigners will entertain no feelings at all in the matter so long as they are afforded facilities to develop the enterprises which bring them to China.

Whether the "constitutionalists" will be satisfied with the institutions which are to represent popular government is a moot point. The resurrection of the old Grand Secretariat system will make them suspicious, and any constitution devised by the Tsan-cheng-yuan, which is to be created to make the final recommendation for a permanent constitution, is certain to incur their distrust. Parliament will be, too, a farce in their eyes, by virtue of the fact that it will be entirely dominated by the President and the high officials. However it is provided that a Lich-sa-yuan, or, literally, "Legislative Department" shall be formed by the election of not more than one hundred members, while a sort of upper chamber will be formed by the members of the present Administrative Conference under the title of the Ko-wen-yuan, or, literally, "Advisory Department." With these organisations the President is convinced that the government of the country can be carried on in a highly satisfactory manner, and that the results will soon persuade the critics among his own nationals that his judgment of the needs of the time was correct.

The one thing certain is that China is now being put to the test which is, in the eyes of the watching world, likely to be final. If the President fails within a reasonable time to restore the finances of the country, to establish peace, to obtain security



General Tuan Chi-jui, Minister for War.

for industrial, commercial and agricultural development, and, in short, to inaugurate a period of general progress, it is likely that the foreign nations will be forced to consider the question of taking control of the affairs of China in order to protect their own interests and the interests of the Chinese people. All supporters of the President feel convinced that he will now be able to demonstrate that, given the opportunity, he is capable of placing China on her feet.

NEW STREET CARS FOR MANILA

After two years successful operation in New York and other cities in the United States and Canada the "Pay-as-you-enter" surface street car has at last reached the Orient. The Manila Electric Railroad and Light Company announce that they shortly intend placing six of the cars in service on their Santa Ana-Rotunda line. The cars are of the centre entrance type, which owing to its many advantages over other types of cars in use has gained much popularity.

The cars are being constructed from designs by Francis J. Tew in the shops of the Company in Manila and are of all steel construction, the only woodwork being in the floors, window frames and seats. The principal feature of these cars is embodied in its name although they are also known as the "stepless" or "low level" car. The car resembles the usual type of enclosed car, except that it has only one enclosed controller platform for the motorman and the sinking of the flooring in the center of the car where there is a large opening. This center opening is divided into three sections, the middle one for all boarding passengers and the other two for alighting passengers. The front end is for first class and the rear for second class passengers. Sliding doors controlled by a lever in the hands of the conductor safeguard passengers. One step and passengers are on the floor of the car and in a position facing them stands the conductor by two fare boxes. Passengers before proceeding to their seats deposit the fare in the boxes.

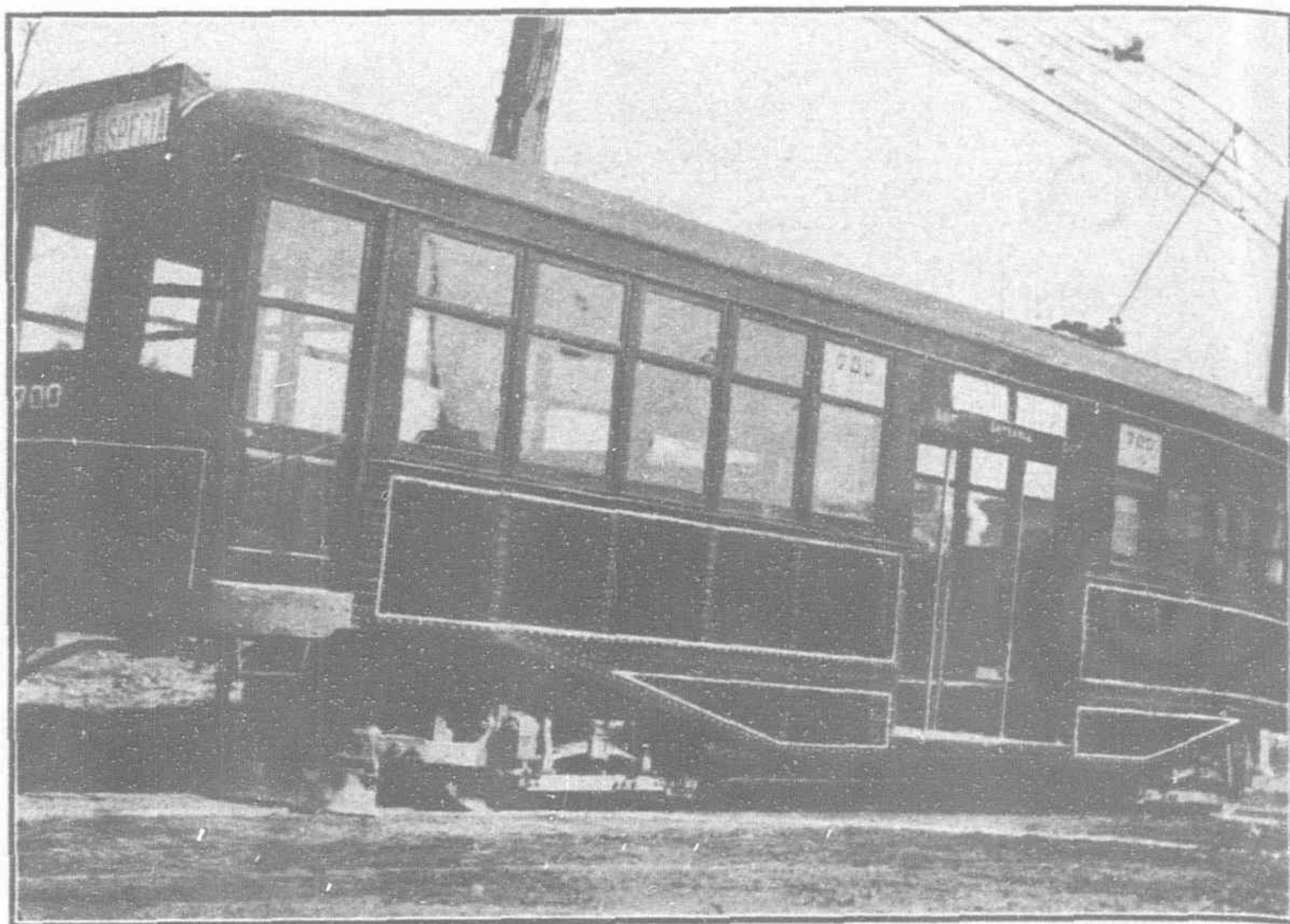


Manila's New Street Cars showing entrance and exit.

The cars are larger and wider than usual and in addition to giving room for wider seats and aisles gives seating capacity to 54 adults comfortably. They are fitted with 50 B. H. P. Motors. The seats are crosswise in the car with a centre aisle and each seat accommodates two adults. There are large drop windows at the sides which are operated by raising the window a few inches, lifting the window sill, then lowering the window and replacing the sill. The rear end of the car is rounded off and makes an observation platform.

The construction of the cars is well advanced and one, which has already been completed, has been successfully run over the lines of the company. The cost of the cars fully equipped is approximately P. 11,000. each.

The South Manchuria Railway Company has obtained the consent of the Chinese Government to carry out the dredging of the River Yalu across the Bar at Wutaokou this year. The work will be commenced very shortly, with four Priestman grab-dredgers.



Manila's New Street Cars.

IMPROVEMENTS AT ZAMBOANGA.

The city of Zamboanga, according to the *Mindanao Herald*, will shortly be bountifully supplied with pure water and electric light and power. Our contemporary, under date March 28, says that a scheme is being worked by the Department Engineer, and the studies that are being made are for a combined water system and electric light plant. The reason for the combination is that the waterworks will probably not be a paying proposition for a number of years while the electric plant, with its cheap power cost, will pay well, thereby taking care of the waterworks deficit.

Mr. H. F. Cameron, the Department Engineer, has mapped out a general plan for the proposition, and Mr. C. G. Yankey, formerly assistant engineer of the province of Nueva Ecija, is now in the field working out the details. Mr. Yankey has the reputation of being an excellent field man and practical engineer.

It is understood that the former plans for the waterworks, upon which work had commenced by Contractor S. A. Vicroy, have been abandoned because of the excessive cost of maintenance, the same being estimated at about P. 28,000 over and above the estimated revenue from sales of water. This sum represents about all the annual revenues of the city available for public works so it was imperative that a more economical method should be worked out, hence the combination of the hydro-electric plant with the waterworks. It is believed that the cost of the combined propositions will come well within the city's authorized bond issue.

The general plans for the new project over which the engineering lines have been run and found feasible are as follow:

Water is taken from the Tumaga River about fourteen kilometers ($8\frac{1}{2}$ miles) from the department capitol and brought down $5\frac{1}{2}$ kilometers on a 0.2 per cent. grade to a point $8\frac{1}{2}$ kilometers from Zamboanga where the elevation at the end of the flume is 135 meters (445 feet) above mean lower low water. Here the water is taken from the end of the flume for waterworks and carried by a small pipe running freely twenty-four hours a day into a reservoir that will set on about the 100-meter elevation above Zamboanga, instead of the 46-meter elevation provided by the old plans. This will give a static pressure of about 130 pounds the square inch in Zamboanga, and a sufficient hydrant pressure for fire so that, like Cebu, no fire engines will be necessary.

The remainder of the water in the bench flume will be dropped in on a steel penstock about 48.7 meters (160 feet) to a Pelton, or other, waterwheel which will operate the electric generating machines. A $8\frac{1}{2}$ kilometer transmission line will deliver the power in Zamboanga where about 100 kilowatts of electricity will be available for use.

The flow of the Tumaga River during this the driest season known in years is twenty-five second feet, and only half of this flow is needed for the present project. At a small extra cost the balance of the water can be used for extra power or irrigation.

ROYAL STATE RAILWAYS OF SIAM

Administration Report for 1912-13.

The sixteenth administration report on the traffic of the Royal State railways in Siam for the Siamese year 131 (1912-13) was presented to H. E. Chow Phya Wongsu Nuprabhadh, Minister of Communications, by Mr. L. Weiler, Director-General of Railways.

The following items are taken from the report:—

LENGTH OF LINE

On 15th November, 1912, a further section of the Northern line Meh Puak—Pak Pan was opened to traffic, bringing the total length open up to 962.1 km, viz:—

a. Broad gauge.	
Bangkok—Korat	264.1 Km.
Ban Phaji—Pak Pan	447.8 "
Ban Dara—Sawaskaloke	28.9 "
Bangkok—Petriu	63.4 "
Branch to Menam River at Bangkok	6.5 "
	<u>810.7 "</u>
b. Narrow gauge.	
Bangkok Noi—Petchaburi	151.4 "
	<u>Total .. 962.1 "</u>

CAPITAL

The Capital outlay from the commencement on all open lines amounted at the close of the year to 62,498,546 Ticals as specified below:—

a. Broad Gauge.	
Bangkok—Korat	17,673,189
Ban Phaji—Den Chai	28,817,492
Den Chai—Pak Pan (accounts not yet closed)	144,000
Ban Dara—Sawaskaloke	816,582
Bangkok—Petriu	3,424,333
Branch to Menam River	614,150
Extensions and improvements	2,719,501
Various surveys	48,125
	<u>Total .. 54,257,372</u>
b. Narrow Gauge.	
Bangkok Noi—Petchaburi	8,115,878
Extensions and improvements	125,296
	<u>Total .. 8,241,174</u>
	<u>Grand Total .. 62,498,546</u>

Percentage of expenditure to gross receipts.

	Year 2455	Year 2454	Difference
Maintenance of Way and Works	11.23	11.38	—0.15
Locomotive Department	15.23	14.85	+0.38
Traffic	9.84	9.22	+0.62
General	0.89	0.81	+0.08
	<u>37.19</u>	<u>36.26</u>	<u>+0.93</u>

The feature of the year under report is a general decrease of the traffic for passengers as well as goods due to the poor paddy crop of the season.

Altogether there were carried 3,114,600 passengers against 3,132,903 in the preceding year and the total goods traffic excluding Railway construction materials and live-stock amounted to 277,296 tons against 286,926 in the year 2454.

The transport of live-stock decreased from 123,630 heads in 2454 to 91,702 heads in 2455. The paddy carried last year amounted to 96,782 tons against 105,777 tons in 2454 and 124,991 in 2453.

FINANCIAL RESULTS

The following are the principal items under this head:—

	Year 2455 Ticals.	Year 2454 Ticals.	Increase Ticals.	Decrease Ticals.	Per-cent.
Gross receipts	4,368,436	4,623,683	....	255,247	5.52
Working expenses	1,624,614	1,676,779	....	52,165	3.11
Net earnings	2,743,822	2,946,904	....	203,082	6.89
Contribution to Renovation Fund	321,443	327,411	....	5,968	1.82
Remaining Net Profit	2,422,379	2,619,493	....	197,114	7.52
Or percentage on Capital account	3.89	4.26	....	....	0.37

REVENUE

Receipts from ordinary Passenger traffic show a decrease of 71,689 Ticals. Details are as follows:—

Receipts from	No.	2455 Amount	No.	2454 Amount	Increase No.	Amount	Decrease No.	Amount
I Class	9,113	44,896	9,518	49,796	....	....	405	4,900
II "	41,479	111,822	37,435	101,682	4,044	10,140	....	....
III "	3,064,008	2,582,837	3,085,950	2,659,766	....	....	21,942	76,929
Total	3,114,600	2,739,555	3,132,903	2,811,244	4,044	10,140	22,347	81,829

Passenger Traffic in Section Order

Section	Year 2455 Ticals	Year 2454 Ticals	Increase Ticals	Decrease Ticals	Receipts Ticals per km. open line during 2455
1. Bangkok—Ban Phaji	722,091	777,834	....	55,743	8,023
2. Ban Phaji—Korat	352,003	332,041	19,962	....	2,023
3. Ban Phaji—Paknampoh	376,598	413,744	....	37,146	2,353
4. Paknampoh—Pitsanuloke	190,198	220,913	....	30,715	1,378
5. Pitsanuloke—Ban Dara	35,263	39,777	....	3,514	511
6. Ban Dara—Utaradit	43,715	47,608	....	3,893	1,619
7. Utaradit—Pak Pan	62,506	60,496	2,010	....	1,157
8. Ban Dara—Sawankaloke	26,159	29,330	....	3,171	902
9. Bangkok—Petriu	228,758	217,725	11,033	....	3,631
10. Bangkok Noi—Petchaburi	702,264	671,776	30,488	....	4,650
Total	2,739,555	2,811,244	....	71,689	2,748 (2,978)

Average fare paid per passenger was Ticals 0.88 (0.90) and the average distance travelled per passenger 43.28 km. (44.61).

Average receipt per passenger per km. amounted to 2.03 stangs (2.01).

Other coaching traffic

	2455 Ticals	2454 Ticals	Increase Ticals	Decrease Ticals
Luggage	21,585	18,393	3,192	....
Special trains and sundries	9,627	164,112	....	154,485
Total	31,212	182,505	....	151,293

GOODS AND LIVE-STOCK

There was a falling off both in the goods traffic and in the conveyance of head of live-stock in 131 (1912-13) as compared with the previous year. In 131 the tonnage of goods forwarded was 293,787 as against 298,238 and head of live-stock 91,702 as against 123,630. The financial return fell from Ticals 1,539,859 in 1911-12 to Ticals 1,504,937. The average receipt per ton was Ticals 5.01 as compared with Ticals 5.05 in the previous year, and the distance goods were carried averaged 179.22 Km.

ROLLING-STOCK

The rolling stock of the broad gauge system was increased by

1 3 axled saloon car for His Majesty the King
20 goods wagons
and decreased by 2 locomotives which have been condemned after having been in service since the commencement of construction of the railways 20 years ago and comprises now:
57 locomotives
209 passenger cars and luggage vans
808 goods wagons
The number of goods wagons does not include 54 open wagons with wooden frames and buffers which are only used for construction purposes.
The rolling stock of the Petchaburi line (1 m. gauge) was increased by:
2 locomotives and
10 passenger cars,

bringing the total to:

10 locomotives
52 passenger cars and luggage vans
109 goods cars.

RAILWAY STAFF

The total number in railway employ at the close of the year under report was 2,785 against 2,710 of the previous year.

They consist of:—

703 Officials (640)
65 Watchmen (57)
315 Workmen (298)
1,702 Coolies (1,715)

Total 2,785 (2,710)

Total Receipts and Expenditure

STATEMENT SHOWING THE TOTAL RECEIPTS AND EXPENDITURE FOR THE YEAR 131 (1912-1913)

Receipts	Standard Gauge		Meter Gauge		Total		Expenditure	Standard Gauge		Meter Gauge		Total		Total as above.
	T	S	T	S	T	S		T	S	T	S	T	S	
Coaching traffic	2,064,424	67	706,343	33	2,770,768	100	Personal emoluments	598,931	62	126,764	62	725,696	124	
Goods traffic	1,246,483	23	133,351	47	1,379,834	70	General charges	62,360	40	12,348	02	74,708	42	
Live-stock	128,037	20	8,967	—	137,004	20	Expenses for maintenance of ways and works	304,057	48	54,586	10	358,643	58	
miscellaneous	70,382	96	10,446	77	80,829	73	Expenses for fuel, pumps and rolling stock	338,885	65	95,395	41	434,281	06	
							Expenses for new works which are not added to Capital Account	28,869	50	2,415	35	31,284	85	
Total receipts	3,509,328	06	850,108	57	4,368,436	63	Total expenditure	1,333,104	65	291,509	50	1,624,614	15	
" expenditure	1,333,104	65	291,509	50	1,624,614	15								
Net earnings	2,176,223	41	567,599	07	2,743,822	48	out of which	2,294,019	37					have been remitted to the Treasury for the year under report.
														remain on the 31st March due to Treasury.

Total as above.

IMPROVEMENTS AND EXTENSIONS ON THE LINES OPEN TO TRAFFIC

I. Charged to Capital Account.

A. Broad Gauge		T.	S.	T.	S.
1	Remodelling and extension of Bangkok Terminus (continued) ..	11,021	12		
2	Completion of installation of vacuum brakes on passenger trains ..	3,384	73		
3	Purchase of a new Royal Saloon car with 3 axles ..	39,013	88		
4	Establishment of a 3rd stone crusher at Chong Kae (to be continued) ..	19,969	30		
Total ..		73,389	03		
Less depreciation					
1	from earnings of stone crusher at Chong Kae Tcs. 7,413.59 ..				
2	from earnings of sawyard Nong Nam Khoon „ 8,000.00 ..	15,413	59		
Balance to be transferred to Capital Account ..					57,975 44

B. Narrow Gauge (Petchaburi line)

1	Stretching of a 2nd telegraph wire from Bangkok Noi to Petchaburi ..	9,069	17		
2	Construction of cross-overs at Ban Chimbhalee and Klong Maha Swasdee ..	5,828	91		
3	Purchase of 10 passenger carriages ..	31,687	10		
4	Construction of a paddy siding at Phrong Maduah ..	1,650	16		
5	Purchase of 2 locomotives ..	77,060	91		
Total ..				125,296	25

II. Charged to Working Expenses

A. Broad Gauge		T.	S.	T.	S.
1	Extension station yard Pak Djong (to be continued) ..	5,653	55		
2	Electric light installation of Royal Saloon cars, ..	5,667	99		
3	Additional telegraph wires ..	5,408	77		
4	Additional water crane at Tapanhin ..	2,478	60		
5	Construction of a siding at Ban Dan ..	1,316	33		
6	Construction of paddy sidings at Nong Quai and at Ban Nong Booa ..	5,241	18		
7	Electric light installation of official quarters at Makasan ..	1,090	80		
8	Quarters for a telegraph lineman at Paknampoh (to be continued) ..	1,081	28		
Total ..				28,028	50
B. Narrow Gauge (Petchaburi line)					
Electric light installation of Royal Saloon car ..		2,415	35		

In addition to the above mentioned works 15,019 Ticals were spent out of the Renovation Fund for replacing timber bridges by more solid constructions, it being the policy of the Department to do gradually away with the timber bridges. They were chosen at the time of construction for the sake of cheapness and quickness. They have proved alright so far, but the elder ones 10 to 15 years old, have given lately trouble in keeping same in good condition. Besides there are in the dry season always some cases of such bridges being set on fire either by the engine itself or by jungle fire, thereby causing inconvenience to the train service.

HISTORY OF THE LINE FROM MEH PUAH (KM. 437.6) TO DEN CHAI (KM. 444.0)

The line was opened to traffic on 15th November. The cost amounting to 246,851 ticals against 265,000 ticals sanctioned have been transferred to capital account and are herewith specified.

Particulars	Total cost	Cost per km.
	T.	T.
Acquisition of Land		
Earthworks:		
Tracing and surveying ..	675	105
Clearing ..	1,289	201
Earth and rockworks ..	72,080	11,263
Fencing (Fencing of Stations excluded)		
Level crossings		
Culverts and Bridges:		
Culverts and masonry of bridges of less than 10 m. span ..	17,736	2,771
Timber bridges ..		
Steel bridges (including piers and abutments) ..	7,799	1,219

Tunnels

Permanent Way:

Rails, fastenings & switches	47,011	7,345
Ballast ..	8,051	1,258
Sleepers ..	9,754	1,524
Transport & laying of P. W. Maintenance	27,085	4,232

Telegraph, Signals, Line Marks and Permanent Way Huts

Way Huts ..	2,230	348
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Stations:

Buildings ..	11,772	1,839
Turntables, etc. ..	6,050	945
Platforms, roads, etc. ..	500	78
Special arrangements for H. M. the King, etc.		

Workshops:

Buildings		
Outfitting with tools and machinery		
Extraordinary Works ..	2,292	358
Rolling Stock ..	21,897	3,421

Administration:

Salaries and allowances, including transport facilities ..	10,049	1,570
Office expenses ..	476	74

Inventory for Construction

..	81	13
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General Expenses:

Sanitary service ..	16	3
Festivities		
Sundries and unforeseen		

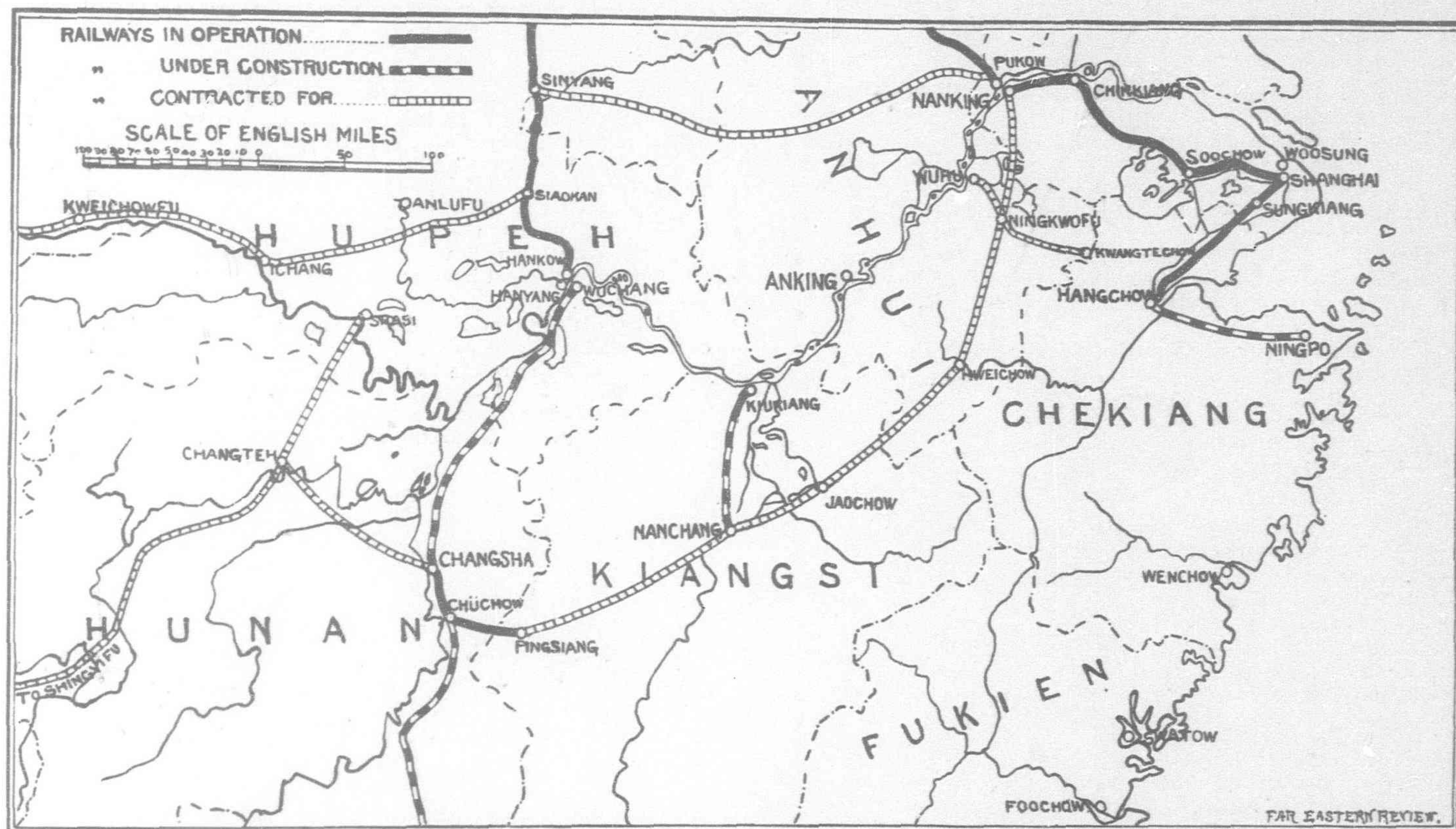
Total .. 246,851 38,570

The Chartered Bank of India, Australia and China have acquired a site in Legation Street, Peking, opposite the American Legation for the purpose of building suitable premises for a new agency.

THE NANKING-NANCHANG-PINGSIANG LINE

The contract lately negotiated between the Chinese Government and the British and Chinese Corporation for the construction of about 800 miles of railway between Nanking and Pingsiang, is one of the most important recently entered into in connection with the development of railway communication in China. The line will traverse an extremely rich portion of China, and will be the means of giving the railway already in operation between Shanghai and Nanking the assistance that it needs to make it at once a paying concern. Apart from this aspect of the question, the line will be of great assistance in developing the provinces of Anhwei and Kiangsi.

Hinterland is important, inasmuch as that port is a large distributing centre for the southern region. It is a Treaty Port, and already exports a largely quantity of rice, wheat, cotton, tea, timber, sugar, paper, furs and feathers, though rice, cotton and tea rank foremost as exports. Hweichowfu is situated in the richest section of Anhui province; is the centre of the tea packing district, enjoys the distinction of being important industrially, and is famous for its Indian ink, its engravings on copper, and its varnish. In other places, says Père L. Richard, silk is manufactured, and iron works are carried on.



Sketch Map showing the proposed route of the Nanking-Nanchang-Pingsiang line.

The accompanying map shows the proposed route of the line. Roughly, it will strike almost due South from Nanking to the prefectural city of Ningkwofu. A branch line will connect with Wuhu on the northern side, and with Kwang-te-chow to the East. From Ningkwofu, the route will be south-westwards to the prefectural city of Hweichow, and thence will proceed to Nanchang, the capital of Kiangsi province, whence it will run west by south to Pingsiang, the terminal of the short railway to Chuchow, on the line from Hankow to Canton.

In the past there was much talk on the part of the gentry to build lines to cover this route, but nothing tangible ever resulted. In 1913 the gentry of Kiangsi formed a company and established offices to build a line between Nanchang and Pingsiang,* a survey of the route having been made. The whole of the country traversed by the railway is under cultivation. It is somewhat mountainous, but rich in tea, cotton, and industries. There are extensive deposits of coal; and gold, silver, copper, and lead mines have been worked by native methods in the past.

Altogether, the project is one of great value to British interests, and while being of benefit in that direction, it cannot fail to be of tremendous importance in the opening up of China. The connection of Wuhu with the

The agricultural products of Kiangsi province are chiefly rice, cotton, tobacco, and hemp; tea being mostly grown in the northwest. The mineral wealth has not been availed of as much as it might have been except at Pingsiang—where the new railway will connect with the line already existing. There coal mines have been already in operation for some time.

Nanchang, the capital of the province, stands in the centre of an alluvial plain, and was originally built on the shore of the Poyang Lake, which has since receded 30 miles northward. It is an important treaty port, and has some manufactures.

The city of Jaochowfu is the great emporium for the sale of porcelain, while Kingtehchen, which will probably be tapped by the railway, is the centre of the oldest porcelain manufactures in the province. This place was established in A.D. 1004 under an Emperor of the Northern Sung dynasty. The kilns destroyed by the Taiping rebels have been rebuilt, but the porcelain turned out is far from equal in colour and finish to that of former times. At the present day it has some 160 furnaces instead of 500, and employs 160,000 workmen instead of 1,000,000, according to Père Richard. The finest porcelain manufactured used to be despatched annually to Peking, the remainder being sold cheaply throughout the country; though a small amount of fancy articles is exported abroad.



Mr. S. B. Shen who is associated with the survey of the Nanking-Pingsiang Railway.

* See FAR EASTERN REVIEW, March 1913.

"THE INDUSTRIAL HARBOUR"

An attractive catalogue with the above title has been issued by the Deutsche Maschinenfabrik A. G., Duisburg. The 152 pages are profusely illustrated with pictures of electrically driven travelling cranes, revolving cranes, locomotive cranes, slewing cranes with tilting bucket, with patent grab and so forth. Every kind of loading and transporting appliance is shown. Some idea of the extent of the operations of the Deutsche

Maschinenfabrik A. G. can be gained from the fact that they supplied about 300 cranes to the town of Hamburg, 36 gantry cranes to the harbour at Montevideo, 20 gantry cranes to the harbour of Yokohama, 15 to Bremerhaven and a similar number to Ghent and nine to Genoa. Moreover the Company has built 63 giant and floating cranes. Its monthly turnover in 1912 was over three million marks.

This extremely comprehensive and complete catalogue will be of undoubted interest and value to those who wish to know the latest developments in the time and labour saving methods of handling and transporting heavy goods.

STANDARDIZATION OF ELECTRICITY SUPPLY IN CHINA

We have received the following communication from the Chairman and Hon. Secretary of the Standardization Committee of the Engineering Society of China:—

With reference to our recent letter to you on the above subject, we have pleasure in stating that a number of meetings have been held of the Committee appointed to consider the above subject and the following decisions and recommendations have been arrived at:—

- (1) That—Generation and Distribution generally shall be on three-phase system at 50 or 60 cycles per second.
- (2) That—Distribution shall be carried out generally on the four-wire 3-phase system with grounded neutral at a pressure of 250 volts between one-phase and neutral, i.e., 440 volts (approximately) between phases.
- (3) That—The standard pressure for domestic lighting and similar supply shall be 250 volts.
- (4) That—When it is not desirable or economical to use a four-wire 3-phase supply, then a three-wire system with neutral grounded or a two-wire system with one side grounded shall be adopted, in all cases the pressure to ground shall be 250 volts.
- (5) That—The use of direct current systems shall be discouraged and they shall not be allowed for systems involving either over 50 K.W. in capacity or having feeder of over half mile in length.
- (6) That—No fuses or switches shall be allowed in the Neutral wire.
- (7) That—Where direct current systems are essential the generation and distribution shall be on the 3-wire system at 500 volts between outers, the neutral being grounded.
- (8) That—The following pressures shall be considered as standards for High Tension transmission:—

2,200 volts, 3,300 volts, 6,600 volts.

Pressures above 6,600 volts to be as required by local and other conditions.

In connection with the above recommendations we may say that the Committee was unanimous with regard to the method of distribution on the four-wire 3-phase system as being most suited to Chinese cities.

A majority was in favour of 250 volts pressure (i.e., between one-phase and neutral) on the consumers premises those members operating systems of 200 volts and upwards were of the opinion that the higher pressure of 250 volts would involve practically no additional risk, but would be distinctly advantageous as regards economy in copper, regulation, etc., the system would also allow the use of 440 volt motors on the same mains as the lighting, and thus render unnecessary the use of different mains for lighting and for power, which in Chinese cities would be prohibitive on account of cost, the relatively low price that could be obtained for electric power and also the fact that power loads are very scattered.

In connection with the above, we may state that the American and French representatives were opposed to a maximum pressure on the secondary side higher than 250 volts, i.e., 125 volts to neutral.

Little trouble in the regulation of lighting due to interference of power loads is anticipated, as it is found by experience that these loads generally do not coincide. The decision to allow both 50 and 60 cycles as standard frequencies was arrived at as it was considered that a single standard of 50 cycles would not receive support from American manufacturers and the use of 60 cycles would allow of cheaper plants where first cost is of paramount importance.

We may add that practically all cities in China having electric supply systems, use overhead mains almost to the exclusion of underground cables.

NEW BUILDINGS IN SHANGHAI

Demolition of old buildings and the erection of new premises is going on all over the Foreign Settlements of Shanghai. On April 7 the premises recently erected for Messrs. Maitland & Co. on Canton Road were thrown open to inspection. They are built in the form of a quadrangle and from the front present the appearance of wings linked up by a glazed court. The building is constructed of brick and is 140 feet in length. The four floors of the eastern wing are given over to godown space and the ground floor of the western wing is also devoted to this purpose. The first floor of the western wing accommodates the compradore and staff, but there is also some godown space available. On the second floor there is further provision for storing goods. The auction room, 60 by 45 feet, a sample room, reception room, manager's room and accommodation for the staff are on the third floor. Elaborate precautions against fire have been taken and the premises are excellently lit and ventilated.

The building was designed by Mr. A. E. Algar, architect, and was erected under his supervision. The contractor was Chang Yi-zung, who is also building the new premises for the Banque de l'Indo-Chine on the Bund. Messrs. Anderson, Mayer & Co. supplied and erected the lifts, the water and fire service has been carried out by the Shanghai Waterworks Co. and the Shanghai Dock & Engineering Co., Ltd., and the New Engineering & Shipbuilding Works, Ltd., were responsible for the construction of the

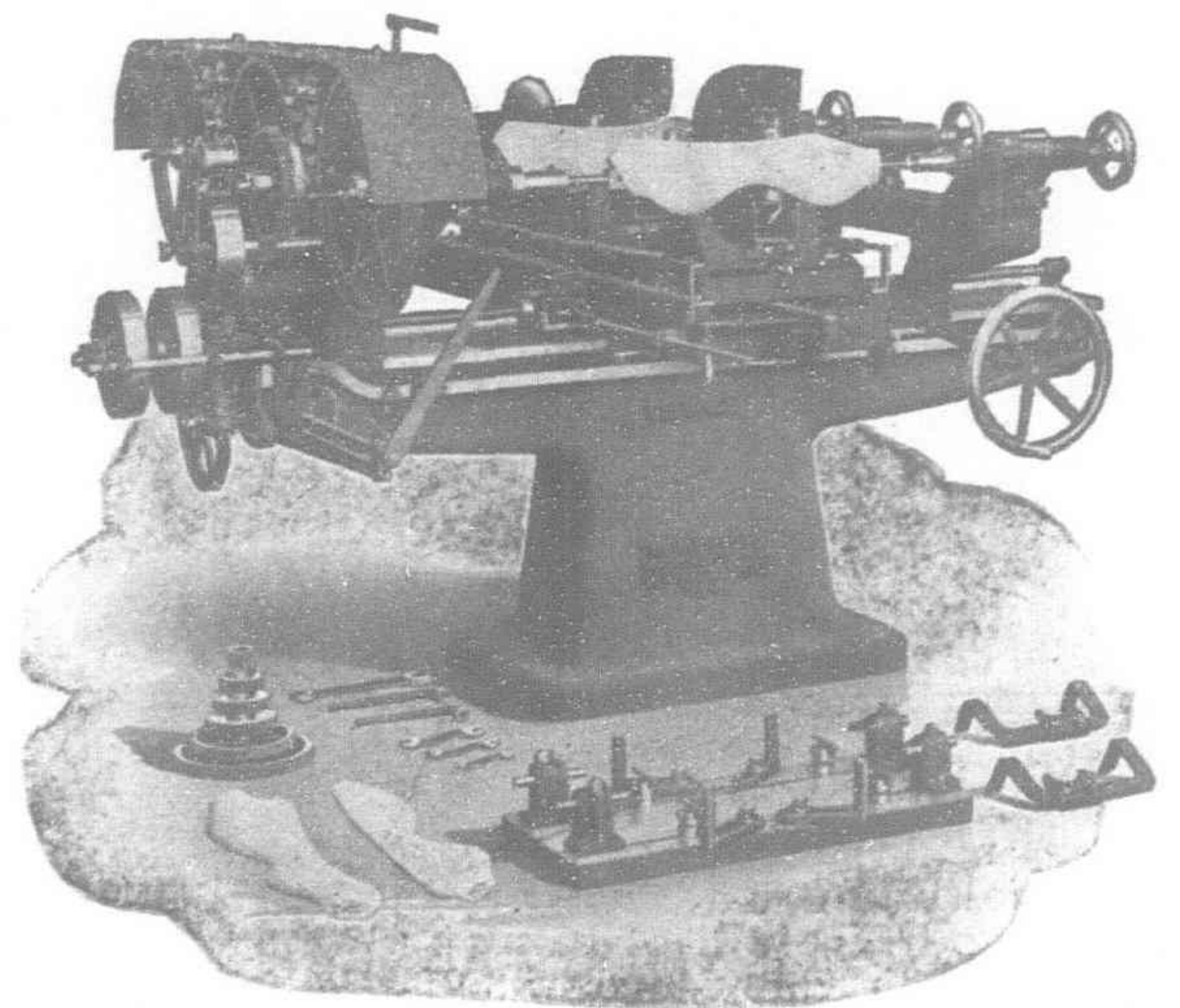
steel work, the latter supplying the circular iron columns for the support of the floors. The former constructed the roof of the cargo space, which includes a new pattern of glazing bar made by Messrs. W. H. Heywood & Co. and imported by Messrs. Duncan & Co. The girders carrying the flooring were imported from Messrs. H. J. Skelton & Co., London.

In the report of the Municipal Engineer for March it was stated that the total number of houses under construction for the three months ended March 31, 1914, was 2,394 as against approximately 1,350 during the corresponding months in 1906, in which year a record number of houses was erected. If the boom in the building trade continued, and there was every reason to suppose that it would, the Municipal Engineer thought that the total number of houses erected in 1914 would reach close upon 9,600, which would be an increase of 4,200 over 1906.

NEW "DEFIANCE" PRODUCT

The No. 303 Patent Double-Head Automatic Copying Lathe, as shown by the accompanying engraving, is especially designed for turning irregular shapes such as hatchet handles, hames, side-bars for saddles, golf stick heads, gun stocks, spokes and other wooden articles from the smallest sizes up to 7" diameter by 38" long. It will produce exact facsimiles of any model placed into the machine. By a simple quick adjustment of the tail stocks, either end of the product can be made larger or smaller than the governing model. One pattern is used to govern both cutterheads which will produce two pieces of an exact duplicate at one time, or one right hand and one left hand piece of the same shape can be turned.

An ingenious centering device can be furnished when so ordered for centering the stock before it is placed into the machine. By this method small stock in the rough can be used which effects a large saving in material. This device locates the center marks, quickly and accurately. Two sets of adjustable stops are furnished for centering right and left hand pieces which avoids disturbing either adjustment.



No. 303 Automatic Double Copying Lathe

The feeding mechanism which controls the cutterhead carriages, is arranged to feed either from right to left or from left to right alternately, or it may be adjusted to feed in one direction only. The starting station may be at the right or left hand end of the machine as desired. It has five changes of feed from $\frac{1}{8}$ " to $\frac{3}{8}$ ", varying $\frac{1}{16}$ " to each revolution of the work being turned, and it can be started or stopped instantly. Adjustable stops are provided for automatically regulating the length of travel to the cutterhead which can be instantly set for any length of turning within the range of the machine.

The cutterheads are fitted with six right and six left hand knives to feed both ways and will turn successfully either hard or soft wood. They are mounted upon sliding frames, supported by substantial carriages which travel across the path of the material to be turned by means of heavy screws driven by double friction feeds which are automatically disengaged when the end of the cut is reached. The frames supporting the cutterheads and guide rollers are gibbed to the carriage and vibrate in a path to correspond with the shape of the model placed into the machine, and they are connected with convenient hand levers to bring the cutterheads up to their work or throw them back out of the way, which can be accomplished while the machine is in motion.

The counter is furnished as follows: Shaft $1\frac{1}{4}$ " diameter by 96" long; three No. 1 roller bearing drop hangers, fitted with rack and pinion belt shifting apparatus; one drum for driving cutterhead $16" \times 44"$; two flange feed pulleys, $2\frac{1}{2}" \times 2"$, for driving feed screws; one two-step cone pulley $6" \times 4" \times 2\frac{1}{2}"$ for revolving stock and pattern, tight and loose pulleys $12" \times 5"$, with the loose pulley fitted with sectional bronze bearings; speed 625 revolutions per minute.

Further particulars and price will be furnished by its makers. The Defiance Machine Works, Defiance, Ohio, U. S. A.

BANGKOK'S WATER SUPPLY

At Chiengrak, near Bangkok, are situated the buildings connected with the water supply scheme of Bangkok, soon to be put into full working, says the *Siam Observer*.

The water supply scheme was decided on in 1911 and tenders were invited by the Sanitary Department for the installation necessary. The work was put in hand some months later and is now almost completed. There was a hope that the formal opening of the water supply station by His Majesty might be possible at the beginning of the Siamese New Year; but, if circumstances do not permit of this date, we are assured that the postponement of the opening will not be for long.

THE CHIENGRACK STATION

As most are aware, the water for the use of Bangkok is brought from a point on the river Menam some twenty miles north of the capital. This water is conducted to the Chiengrak Station by a canal about which, *en passant*, we may here take the opportunity of contradicting a certain rumour which has been disseminated locally. This rumour is to the effect that boats and barges will be allowed to use this canal with the result that the water will arrive in a very polluted state at the Pumping Station. We have authority for saying that such a statement is wholly incorrect, and can have been circulated only for a malicious purpose.

In the Chiengrak station the first building that attracts attention is the Pumping House. Here have been installed two low lifting and three high lifting electric pumps of the well known centrifugal pattern made by the A.E.G., the work of installation having been carried out by the local Electricity Company. The low-lifting pumps force what is termed the "raw" water (that is unfiltered water) into the subsiding basins which will be described later, and the "high-lifting" pumps are for the purpose of conveying the water to the elevated reservoirs at Wat Sakhet *after* it has been purified. The pump-house building has been erected by Mr. G. Kluzer and is a fine piece of work, its handsomely tiled floor and general character eliciting much admiration.

CLEANSING THE WATER

From the pumping chamber the raw water is conveyed and on its way is subjected to a solution of sulphate souminea which is prepared in another building in the following manner: The solution is first made of the strength per gallon decided on as necessary by analysis. It is then put into a dissolving box and agitated by an air compressor, after which it is carried by a vulcanised rubber pipe to meet the raw water as previously stated. There are five regulating cocks for regulating the amount of aluminea solution required for the water to be passed into the twelve filters, as well as a supplementary cock which may be used if necessary. The amount of solution thus employed is subject to the medical officer's instructions and is therefore always adequate and scientifically measured.

The raw water then, having been well mixed, with sulphate aluminea solution, is pumped into four chambers technically known as "subsidence basins" but more commonly termed "settling tanks" of reinforced concrete. Here it is allowed to coagulate, and the heavier impurities are precipitated in the manner familiar to Bangkok residents who are wont to have alum placed in their water jars.

THE FILTER CHAMBER

Having thus been coagulated, the water has reached a comparative state of purity but there may be other noxious elements such as the bacteria and bacilli of disease in it of which it is yet necessary to get rid. From the subsidence basins, therefore, the water is now carried to the filter chamber and this is perhaps the most interesting part of the whole establishment. Like the subsidence basins and the coagulating tank, the filter house building is the work of United Engineers Ltd. to whom these contracts were entrusted: while the filters themselves are on the excellent system patented by the Jewel Filter Co. of New York and London whose representative Mr. George E. Hopkins was sent to Bangkok and has superintended the carrying out of the work necessary in a highly satisfactory manner.

There are twelve Jewel filters in all, and the process to which they subject the water arriving from the coagulating tank is a most interesting and ingenious one. These filters consist of an inner and outer tank. In the former is placed a quantity of exceedingly fine sand to a depth of some one and a half metres. The water from the coagulating chamber flows up the outside tank and over a weir into the inner tank containing the sand through which it passes, being subjected *en route* to the well known purifying virtue which sand possesses. The sand of course after a certain time needs washing, but there is an extremely ingenious indicator showing automatically when washing is necessary. When the indicator registers this stage water then flowing, be it noted, is cut off automatically.

METHODS OF WASHING SAND

Washing is necessary on an average once in fourteen hours and is done by pure water obtained from the filters. This is conveyed up through the sand which is agitated by a sort of rake, and afterwards the water travels through the outer tank and is allowed to run out to waste. When the washing has again cleared the sand to the medical officer's satisfaction of the impurities it has collected, the washing apparatus is shut off and filtration proceeds again.

This filtered water whose purity is guaranteed at 98 per cent. is now in an entirely drinkable state, and is collected in a small chamber and flows to the clean water reservoirs whence it is pumped by the high lifting pumps through an immense supply pipe to the elevated reservoirs whose water towers are familiar landmarks near Wat Sakhet. In these water towers the drinkable water rises to a height sufficient to obtain pressure throughout the city.

Bangkok has every reason to congratulate itself on its good fortune in possessing a water-supply installation of the most modern and elaborate character comparing favourably with, and in numerous instances excelling that of, other great cities in the world. The supreme control of the entire work has been in the capable hands of Mr. S. R. de la Mahotiere, Director of the Sanitary Department, and his assistant Mr. Didier.

The construction of no fewer than four new lines of tramway is proposed for Jerusalem, says the Constantinople correspondent of *The Times*. All will start from the Jaffa Gate, on the western side of the city wall. One will run through the principal commercial quarter and the new Jewish suburbs for two miles along the Jaffa road. Another, branching northwards, will serve another mass of Jewish settlements. A third, bearing to the northeast past the New Gate, and running for a while more or less parallel with the city wall, will then turn northward, passing the Tombs of the Kings, and follow the Damascus road to the

head of the Valley of Jehoshaphat. The fourth line contemplated will run from the Jaffa Gate to Bethlehem, some six miles to the south. None of these lines enters within the walls of the old city, the streets of which are too narrow to admit trams without extensive and costly expropriation and demolition. By the terms of the concession the municipality is to become owner of the tramway after forty years. First-class fares will not exceed 1½d., except between the Jaffa Gate and Bethlehem, a journey costing 3 piastres (6d.)

TRADE AND INDUSTRIES OF CHOSSEN

[BY CONSUL-GENERAL GEORGE H. SCIDMORE, SEOUL]

The foreign trade of Chosen (Korea) has increased from \$11,613,334 in 1901 to \$43,874,330 in 1912. In the latter year imports were valued at \$33,423,493 and exports at \$10,450,837, as compared with imports of \$26,935,665 in 1911 and exports of \$9,390,764.

The continued excess of imports over exports is largely due to the causes referred to in previous reports, namely, the political and economic relations of Chosen with Japan. The maintenance of its army garrison, civil, police, and judicial departments, railways, posts, telegraphs, education, harbors, roads, and other public works still imposes upon Japan the expenditure of many millions in excess of revenues obtained from Chosen.

In addition to general merchandise, the movements during 1912 of specie and bullion were: Exports, \$5,041,867; imports, \$733,760. Compared with 1911, these movements, show a decrease of \$1,477,906 in exports and of \$1,626,384 in imports.

DISTRIBUTION OF CHOSSEN'S TRADE

The trade of Chosen during 1912 shows increased exports to Japan, Great Britain, China, and Belgium; decreased exports to the United States, Germany, France, Russia in Asia, and other countries; and increased imports from all countries, except France.

CUSTOMS RECEIPTS—SHIPPING

The Customs receipts of Chosen during 1912 amounted to \$2,523,433, as compared with \$2,100,765 in 1911. The source of the receipts in 1912 was as follows: Export duties, \$210,772; import duties, \$2,218,818; tonnage dues, \$46,692; other receipts, \$47,151.

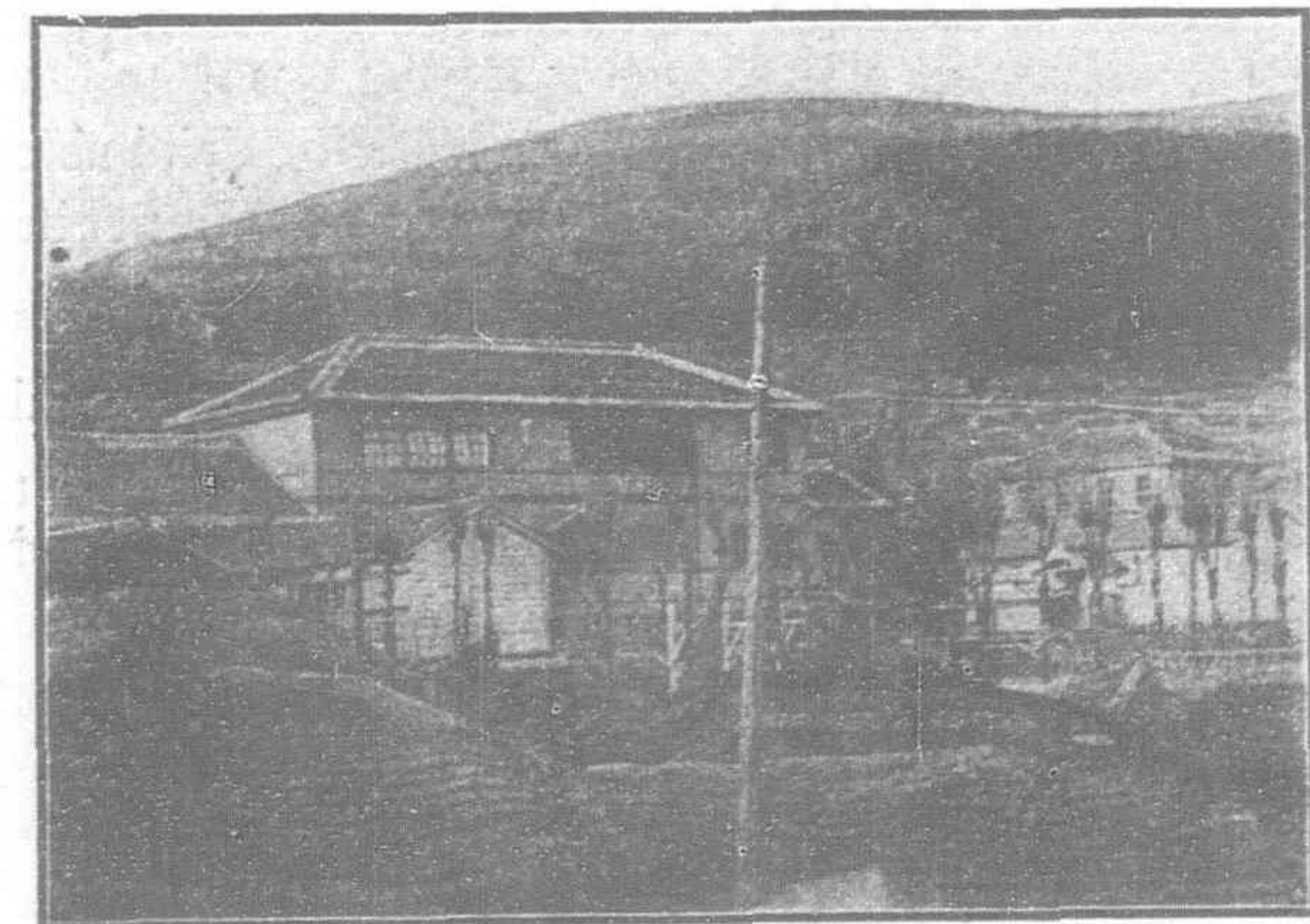
The tonnage of vessels entering the ports of Chosen in 1912 was 3,888,353 and that of those cleared 3,827,022. Of the tonnage entered, steamers accounted for 3,735,892, sailing vessels 63,058, and junks 89,403; of the clearances, steamers accounted for 3,684,299, sailing vessels 58,472, and junks 84,251.

TRADE WITH THE UNITED STATES

Invoices certified at this consulate general show the value of exports from Chosen during the year 1912 (exclusive of returned American goods valued at \$649) to have been \$45,627, of which the principal items were gold and copper concentrates \$37,142, household effects \$3,573, and cabinet ware \$1,483. The customs returns, however, show a total value under this head of \$47,585, a decrease, compared with the year 1911, of \$427,180.

The year 1911 was exceptional, owing to shipments, valued at \$419,707, of old Korean copper and brass coins that had been withdrawn from circulation and were sent to the United States to be melted down as scrap metal.

During 1912 the value of imports from the United States was \$3,217,094, an increase of \$1,095,164. This increase appears principally under



An Industrial School at Fusan.

the heads of agricultural tools and machinery, bicycles, building material, chemicals, clothing, comestibles, flour, salted fish, surgical instruments, galvanized iron, nails, pipes and tubes, miscellaneous manufactures of iron and steel, leather, condensed milk, kerosene oil, lubricating oil, railway supplies, soap, tin, and tobacco. Decreases are noticeable in cotton goods, electric-light apparatus, and timber.

FINANCES—BANKING

The budget of Chosen for the fiscal year ended March 31, 1913, estimated a revenue to produce \$26,116,220, of which \$13,312,701 was expected

from ordinary sources, while the balance was to be obtained from the following: Balance brought over from previous year, \$380,142; loans, \$6,273,077; transferred from budget of Imperial Government, \$6,150,300. This shows a continuing necessity for extraneous assistance to the sum of \$12,423,377. Compared with the preceding year, the increase in estimated revenue amounted to \$1,957,446, of which \$1,441,678 was ordinary and \$515,768 was extraordinary in origin.

The total contemplated expenditures amounted to \$26,116,220. Increases in various lines were as follows: Communications, \$155,120; railways, \$716,857; encouragement of industry, \$76,530; land investigation, \$310,290; Seoul waterworks, \$88,563.

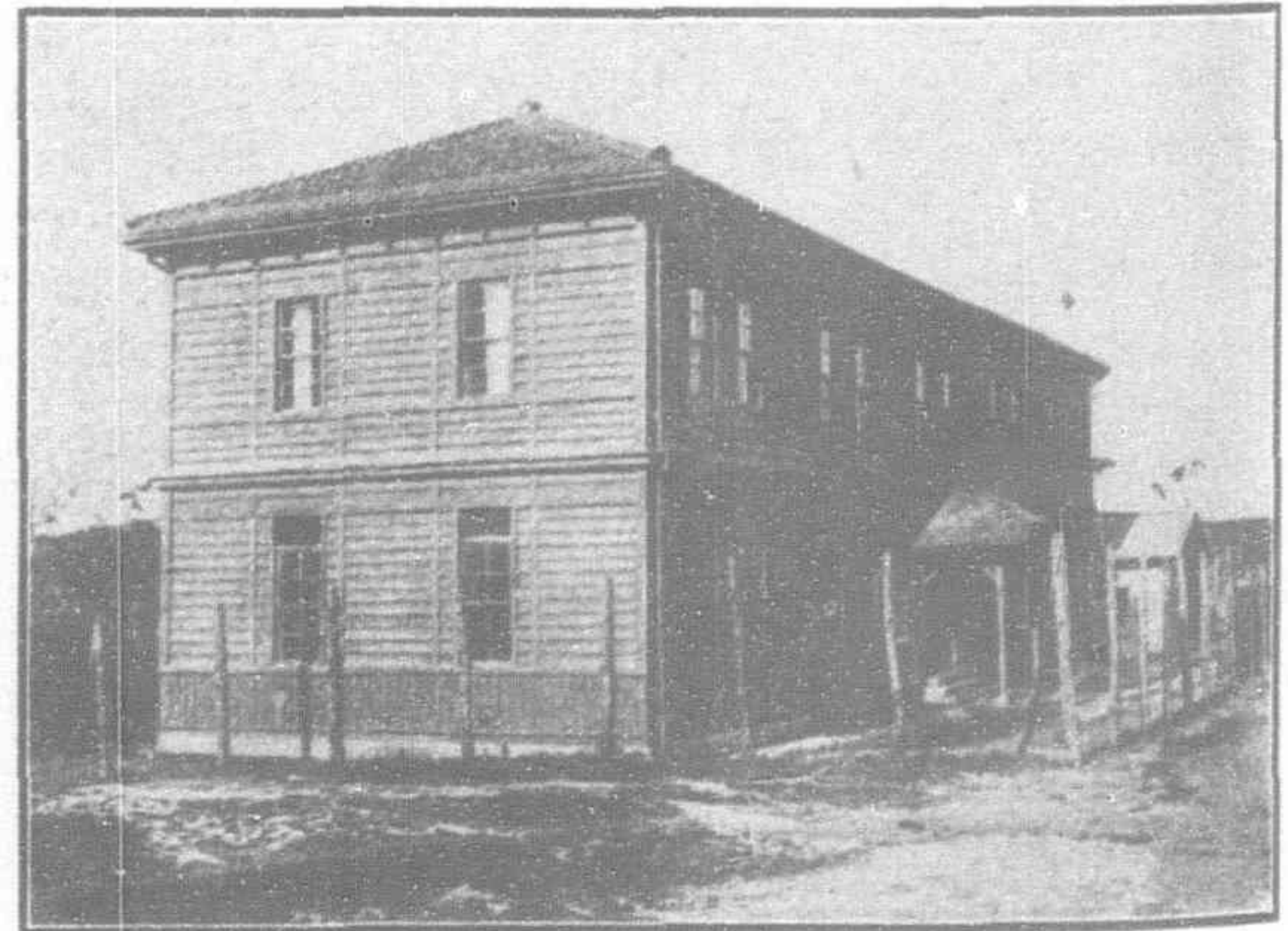
The growth of the postal savings banks in recent years has been very rapid. In 1912 depositors numbered 338,176, as against 182,763 in 1911, 138,184 in 1910, 106,644 in 1909, and 60,587 in 1908. Deposits in 1912 amounted to \$2,406,924 as compared with \$1,959,777 in 1911, \$1,540,578 in 1910, \$1,161,167 in 1909, and \$634,478 in 1908.

On December 1, 1912, the rate of interest on deposits in the postal savings banks was raised from 4.2 per cent. to 5.4 per cent. In explanation of this change, the director of the Postal Money Order and Savings Bank Office is reported as saying:

The present measure, in the opinion of the authorities concerned, is very timely. The rate of interest on bank deposits is, as a rule, higher in Chosen than in Japan proper. During last year, for instance, the rate of interest of fixed deposits in banks was 5.7, or in case of agricultural banks 5.5 per cent. per annum in Chosen, while it was only 4.7 or 4.8 in Japan proper. But the rate of interest on deposits in the Postal Savings Bank in

Chosen was the same as in Japan proper. Needless to say this is a failing which is not associated with the tendency of the money market in Chosen. As it is, however, the raising of the rate of interest just effected is viewed with some misgivings by some people who seem to consider that this will result in diminishing deposits in general banking corporations in Chosen. This is an unnecessary fear, however, as banks in Chosen are established only in cities, where in the matters of deposit they are favored with constant local customers, so that the Postal Savings Bank is only able to invite deposits that are not deposited in banks. This being the case, there need be no fear that the raising of the rate of interest on deposits in the

Postal Savings Bank will impede the industry of private savings banks if the raised rate does not exceed the general bank rate. It may be mentioned that the raised rate of interest is still lower than the bank rate in Chosen, so that it is simply absurd to suppose that the banks will be deprived of the greater part of their deposits, and that the Postal Savings Bank will absorb such.



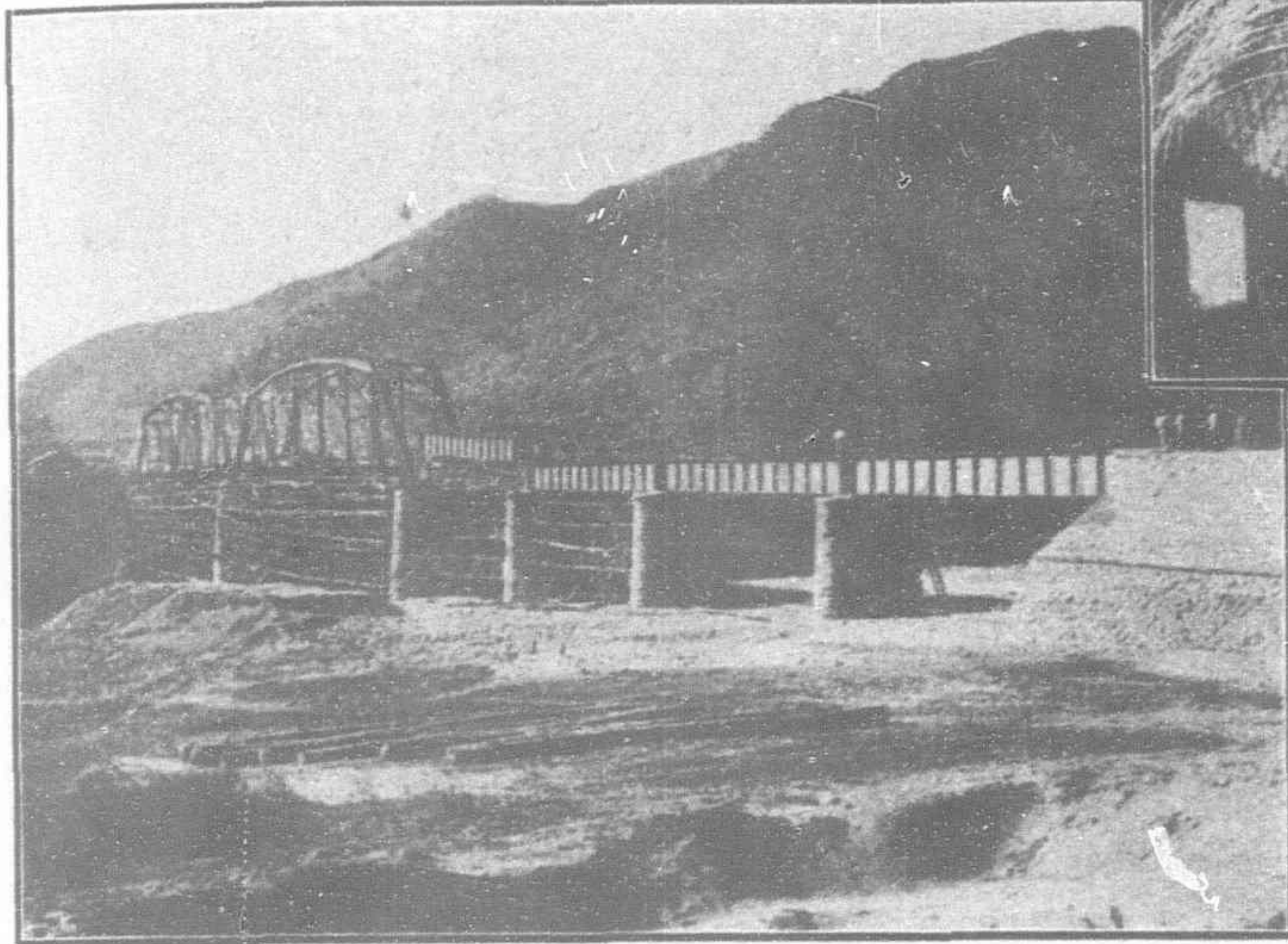
An Agricultural School at Pying-yang.

Though a great development has recently been made by Koreans with regard to the economical condition, they are still lacking in the habit of saving, so that it is a matter of first importance at present to induce them to utilize as far as possible organs for saving. How much they fail in making savings may well be shown by the fact that of the total amount of savings in Chosen, amounting to 5,000,000 yen (\$2,490,000), only 630,000 yen (\$313,740), or one-eighth belongs to Koreans. Under the circumstances, no one will deny that encouragement of savings among Koreans is greatly to be desired, and consequently measures taken to inculcate in them the habit of saving are to be approved.

During the latter parts of 1912 the Oriental Development Co., negotiated a loan in Paris for 20,000,000 yen (\$9,960,000) for the purpose, it is understood, of enabling the company better to carry out its schemes for the advancement of various industries in Chosen and the encouragement of immigration from Japan. This company came into existence in December, 1908, with an authorized capital of 30,000,000 yen (\$14,940,000), of which it is reported one-fourth has been paid up, and with an annual subsidy from the Japanese Government of 300,000 yen (\$149,400) to extend over a period of eight years.

RAILROADS

In February, 1912, the Railway Bureau of the Government General announced the arrangement of a triweekly through express train service between



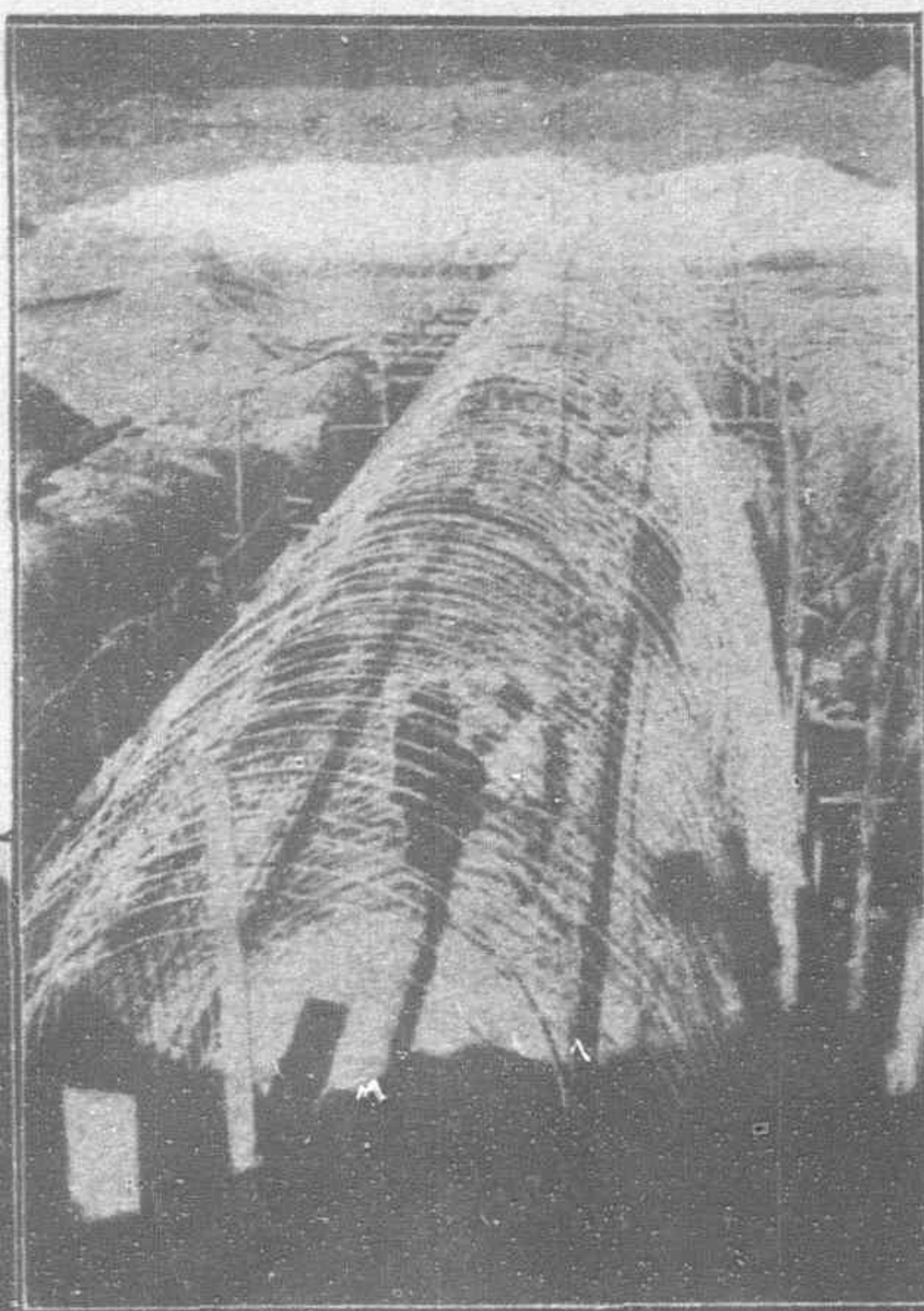
Railway Bridge Construction on Keijo-Gensan (Wonsan) Line.

Seoul and Changchun (673 miles,) connecting at the latter place with the trans-Siberian route to Europe, and reducing the time of travel from Seoul to Moscow to 10 days, to Berlin to 11½ days, and to Paris or London to 12½ days. The trains of this service are composed of the most modern and comfortable sleeping and dining cars and carry first-class passengers only; and judging by the increasing numbers of tourists and others using them, are giving satisfaction. The journey between Seoul and Peking was, at the same time, reduced in duration to 2½ days, and that between Seoul and Tokio has been shortened by 4 hours. In June, 1912, the through express service without change of cars was extended to Fusan.

The following summary of progress of railway construction in Chosen was published by the *Seoul Press* of December 18, 1912:

As it is known by the public the greater part of the Honam Railway and the Seoul-Wonsan Railway from Seoul to Cholwon, have already been opened to public traffic. As for the remaining sections, the director of the construction section of the railway bureau of the Government General, as quoted by the *Keija Nippo*, says that they will in all probability be finished by the summer of 1914 and open to public traffic. Work on the Honam Railway, from Mokpo to Hakkyoli, some 22 miles in length, is expected to be completed by next June, but its opening to public traffic will probably be postponed until August, in order to avoid probable damage to the line from floods in the rainy season, which usually sets in Chosen in July. The section from Hakkyoli to Laju, 13 miles in length, is also expected to be open to public traffic at the beginning of October. With the opening to public traffic of the Mokpo-Laju section, the Honam Railway will be completed, except between Laju and Chyongseup, 43 miles in length, which distance will require the piercing of several tunnels. Work on this section will be very difficult, but it is expected that it will in all probability be completed by the summer of 1914, when an opening ceremony of the whole Honam line will be celebrated on a grand scale at Mokpo or some other suitable place.

In contrast to the measures taken with regard to the Honam line—that is, the finishing it within the shortest possible period—the construction of the Seoul-Wonsan Railway is being engaged in with a view to permanency. For instance, iron is used in the construction of bridges on the Seoul-Wonsan Railway, where wood is used on the Honam Railway. A circuitous route, to avoid boring tunnels, is resorted to for the Honam line, but



Tunnel construction with Concrete and Iron Frames.

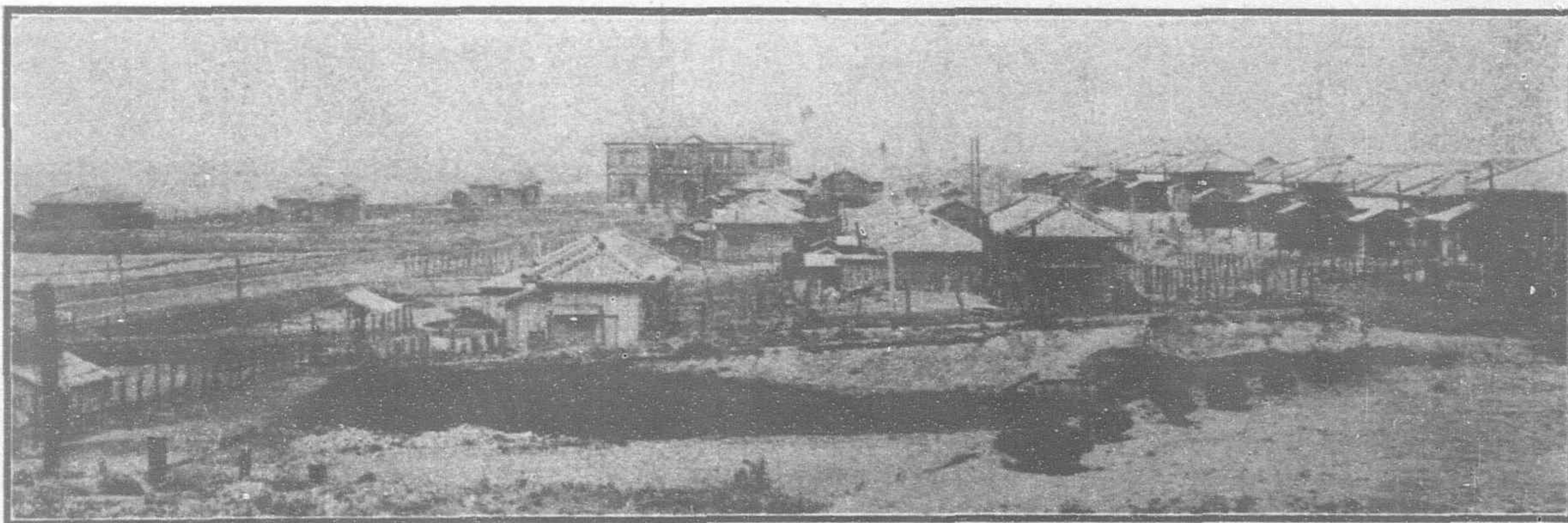
on the Seoul-Wonsan line the boring of tunnels is not postponed unless of necessity. As it is now the cold season, work on the Seoul-Wonsan Railway is suspended. It will be resumed as soon as the warm season sets in, and the section between Cholwon and Pokkei, 16 miles in length, is expected to be finished and open to public traffic at the beginning of August next year. From Pokkei to Keumpulrang, 10 miles in length, traffic will be run by the middle of October at the latest. It will be remembered that work on the Seoul-Wonsan line has been started from Seoul and Wonsan at the same time. The track from Wonsan to Sokwangsa, 18 miles in length, is expected to be finished by August next year; that from Sokwangsa to Kosan, 9 miles in length, by November of the same year. With the completion of these two sections, work on the Seoul-Wonsan Railway will be incomplete only between Kosan and Keumpulrang. The distance is 24 miles, work on which is expected to be very difficult, owing to the geographical features of the place. The boring of 16 tunnels will probably be necessary, and bridge work will be carried on under very considerable difficulty. Work on this section will, however, be completed early in 1914 when a grand opening ceremony of the whole Seoul-Wonsan line will be given, probably at Wonsan.

AGRICULTURE—GINSENG, SILK, COTTON

Previous to its culture and sale being made a Government monopoly in 1908, Korean ginseng had long held a foremost place in the esteem of the Chinese and other believers in its medical virtues, until gross mismanagement and speculation had brought the industry to almost complete ruin. Since that year many reforms have been introduced in the cultivation of the plant, in the eradication of its diseases, and in the manufacture of medicine from its root, and present prospects indicate that it will be soon restored as a profitable source of revenue. Plants renewed four or five years ago are now approaching maturity, and the profits from sales, which in 1911 amounted to \$85,860 are reported to have risen to \$190,385 in 1912 while it is estimated that the profits during 1913 will reach \$352,016. In the latter part of 1912 the best quality of medicinal ginseng sold in Chosen at the rate of \$40.84 per pound.

There are now over 116 sericultural training institutes established by the Government General in Chosen, and a large staff of itinerant lecturers is employed in giving instruction and aiding in the introduction of new stocks of silk worms and new methods of work. This industry gives abundant promise of prosperity. The product of Korean cocoons during the year 1912 is estimated to have been about 150,000 bushels.

The estimated area of land in Chosen suitable to cotton growing is 1,280,000 acres, and the Government General is continuing its efforts to encourage the introduction of American upland seed. These efforts have been followed by very satisfactory results. The value of the exports of



Government salt manufacture station at Koryo Bay, near Chinnampo.

Korean cotton during the past four years was as follows: 1909, \$135,966; 1910, \$151,833; 1911, \$125,640; 1912, \$216,927. Nearly all of these exports went to Japan. The crop of 1912 was, in September, 1912, estimated at 37,527,666 pounds.

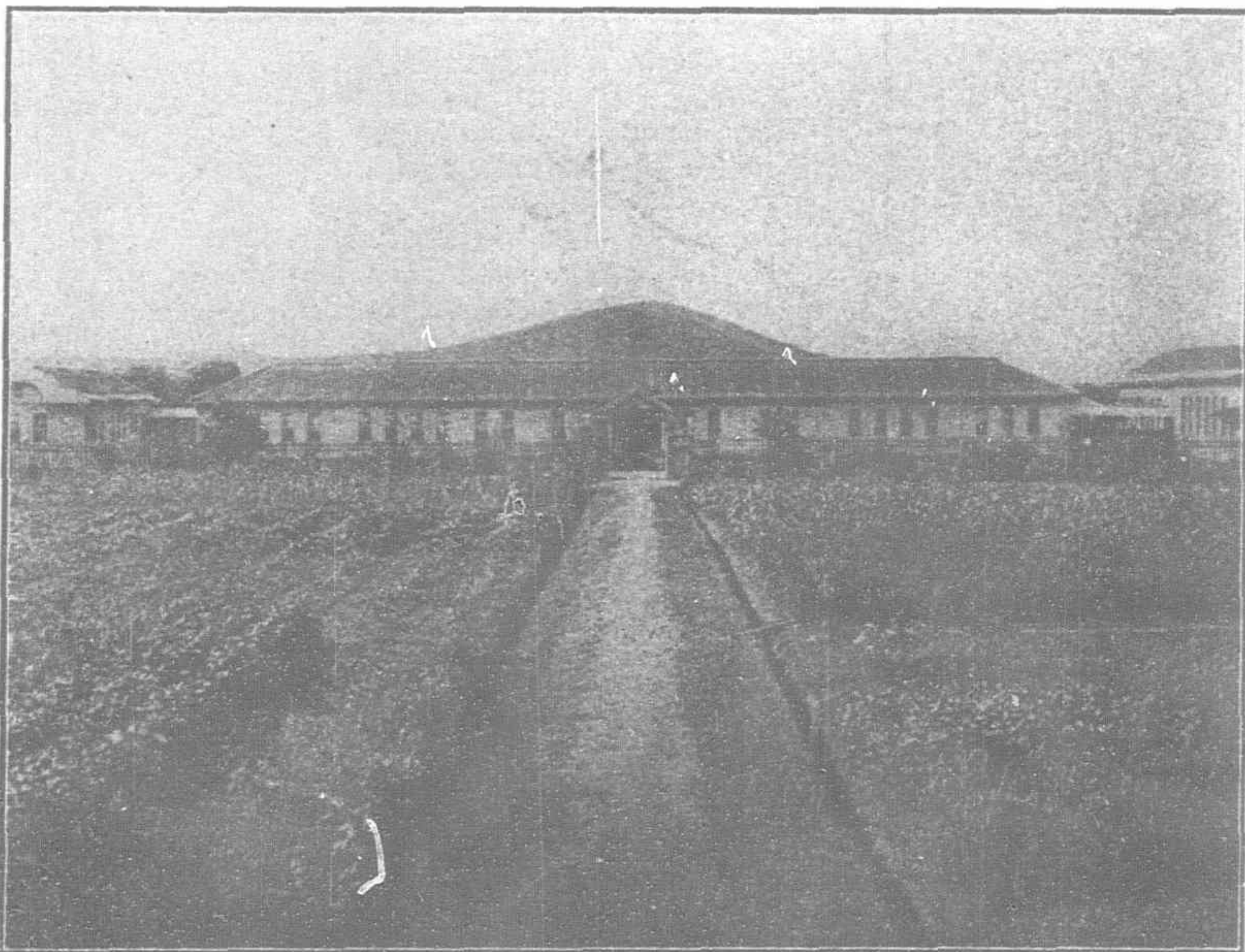
RICE AND OTHER CROPS

The Korean rice crop of 1912 is estimated in round numbers at 44,348,100 bushels, a decrease of 4,136,900 bushels as compared with 1911. Disastrous floods were the principal cause of this decrease. The introduction of a superior kind of Japanese rice seed, known as wase shinriki, has been followed by most encouraging results. Compared with the Korean seed heretofore in general use, it is said to require a smaller quantity of manure, yields some 35 per cent. more, brings a price per koku (about 5 bushels) higher by \$1, resists insects and floods, and is of superior quality when cooked.

MINING RETURNS

Gold mining in Chosen during 1912 continued to give steady and satisfactory results. The following data are from reports of the leading companies engaged in this industry.

The Oriental Consolidated Mining Co., an American corporation operating in the northwestern part of Chosen, as heretofore leads all others in the amount of its capital and the extent of its operations. Its report for the year ended June 30, 1912, published September 6, 1912, shows total receipts of \$1,562,109.77; operating costs, \$864,490.98; operating profit, \$697,618.79; returned to development, construction, etc., \$45,092;



Agricultural and Dendrological School attached to model farm in Suwon.

net receipts, \$652,526.79; tons of ore mined, 321,343; mining cost per ton, \$1.62; value of bullion sent to Osaka Mint, \$1,549,204.50; estimated ore reserves, 741,000 tons, valued at \$3,849,000.

The Seoul Mining Co., incorporated under the laws of Connecticut and operating in Hwang Hai Province, reports for the year ending December 31, 1912, a total recovery of \$594,872; operating expenses, \$221,200; net profit, \$373,672.

The Chiksan Mining Co., recently organized under the laws of West Virginia with a capital of \$1,000,000, during 1912 devoted most of its work to the erection of new stamp mills and other machinery, to development, and to the prospecting of placers. The area of its concession covers about 260 square miles.

The Kapsan mining concession in the north of Chosen is held by the Collbran-Bostwick Development Co., of Hartford, Conn., and contains extensive deposits of copper, and covers an area of 50 by 88 miles. Development work was continued during 1912.

MINING CONCESSIONS—MINERAL EXPORTS

The following statistics, furnished by the Mining Bureau of the Government General, show the number of mining concessions of all kinds held in Chosen on December 31, 1912:

Nationality of holders.	Mines.	Placers.
Japanese	391	98
Koreans	195	148
Japanese and Korean	20	19
English	6	1
American	19	10
Japanese and American	4	.....
Korean and American	1	.....
German	5	.....
French	3	1
Italian	1	1
Russian	1	.....
Total	646	278

The value of the exports of mining products from Chosen during 1912, according to the report of the Mining Bureau, was as follows: Gold, \$4,689,285; silver, \$16,000; copper, \$1,531; iron, \$155,221; graphite, \$82,309; coal, \$166,522; total \$5,110,868.

NEW LEGISLATION

By ordinance of March 18, 1912, the Government General extended in operation over Chosen a very large and important body of Japanese laws, including the civil code, the commercial code, the code of civil procedure, the bankruptcy law, and others of a general character, and a complete reorganization of the courts was effected. In causes where both parties are Koreans the force of ancient customary, or common, law is preserved.

By order of the Governor General on March 28, 1912, the functions and duties of the various departments and bureaus of the government were rearranged, with a view to greater efficiency and economy. On March 28, 1912, laws and ordinances were promulgated whereby the export duties on rice and most other articles were abolished.

By ordinance taking effect April 1, 1912, the laws of Japan comprised in the criminal code, the code of criminal procedure, and laws subsidiary and supplementary thereto, were extended over Chosen, and the old Korean criminal laws were repealed. Other ordinances, taking effect at the same time, made provision for the systematic registration of all matters affecting titles to real property.

On August 13, 1912, an ordinance and regulations were issued, supplementing and, in a few particulars, modifying previous measures relating to land surveys and titles. On August 21, 1912, an ordinance was issued for the control of the manufacture, sale, transportation, and keeping of firearms and ammunition. On October 24, 1912, an ordinance controlling the business of banking was issued. On December 17, 1912, an order of the Government General was issued providing for quarantine measures in connection with the importation of trees and plants.

POPULATION

On December 31, 1911, the official estimate of the total population of Chosen was 14,055,869, comprising 210,689 Japanese, 13,832,376 Koreans, 11,837 Chinese, 967 other foreigners.

Under the head of "Other foreigners" are included: Americans, 568; British, 183; French, 100; Germans, 49; Russians, 26; Norwegians, 12; Turks, 8; Austrians, 6; miscellaneous, 15.

The population of Seoul, the capital, on February 29, 1912, was estimated at 291,549, of whom 46,061 were Japanese, 2,099 Chinese, and 258 other foreigners.

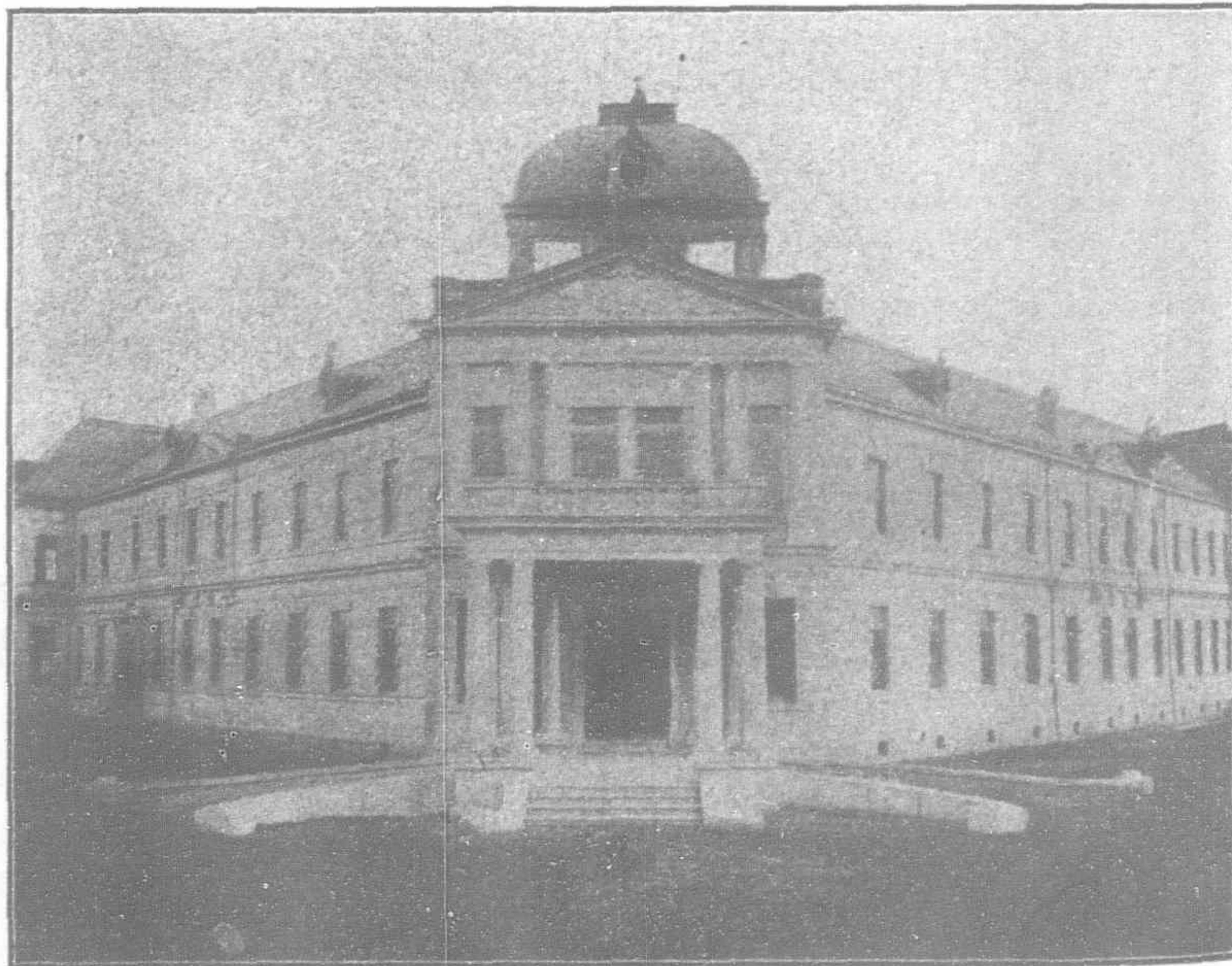
HIGHWAYS AND STREET IMPROVEMENTS

According to a statement credited to the Director of the Public Works Bureau of the Government General it appears that it is proposed to expend for road construction and improvement in Chosen the sum of \$4,080,000, covering a period of five years, beginning with 1911. About 500 miles of the more important roads contemplated in this scheme were expected to be completed by the end of March, 1913, at a cost of \$1,743,000.

In place of the narrow, tortuous, and insanitary lanes which have heretofore characterized Seoul there are now in rapid course of construction paved and macadamized thoroughfares, having widths, 1 of 180 feet, 1 of 115 feet, 3 of 90 feet, 5 of 72 feet, 5 of 60 feet, and 15 of 48 feet. It is estimated that these improvements will cost about \$6,474,000.

CHOLERA.—HOSPITALS

During September, 1912, a few cases of cholera appeared at Chinnampo and Fusan, but the police authorities took immediate and most effective action and prevented its spread. In this and in other directions the excellence of the sanitary organization of the Government was most strikingly illustrated.



The offices of the Oriental Development Company at Keijo.

The pioneers in effective medical work in Chosen were the American missionaries, and their well-equipped hospitals and dispensaries continue to expand in usefulness. At each of the gold-mining concessions under American control excellent physicians are employed and they annually treat thousands of charity patients in addition to employees. These beneficent efforts are now, of course, overshadowed by the measures under Government control. In November, 1912, the number of hospitals in Chosen was reported as 124. During the year 1912 the patients treated at the Government General Hospital at Seoul are reported as numbering

48,490, while in 18 other Government provincial hospitals the number is said to have been 206,752.

FORESTRY—EDUCATION

The efforts of the Government in connection with reafforestation are attended with good results and the interest and co-operation of the people in this matter are becoming more manifest. The heretofore barren hills of Chosen are steadily assuming a better aspect and Arbor Day (April 3) is now an established success.

On January 6, 1912, the Governor-General published in the Official Gazette the rescript on education of the Emperor of Japan of October 30, 1890, to be read frequently and observed in schools in Chosen as a basis of ethical instruction. This rescript inculcates filial piety, affection between brothers, sisters, husbands, and wives, fidelity to friends, modesty and moderation of demeanor, the pursuit of learning, the cultivation of the arts, respect for and observance of the constitution and laws, and loyalty to and self-sacrifice for the State in emergency. The private schools of Chosen in January, 1912, numbered 1,721, of which 677

Kaisha (Chosen Mail Steamship Co.), and provision is made in the budget of the coming year to give it an annual subsidy of 316,761 yen (\$157,747).

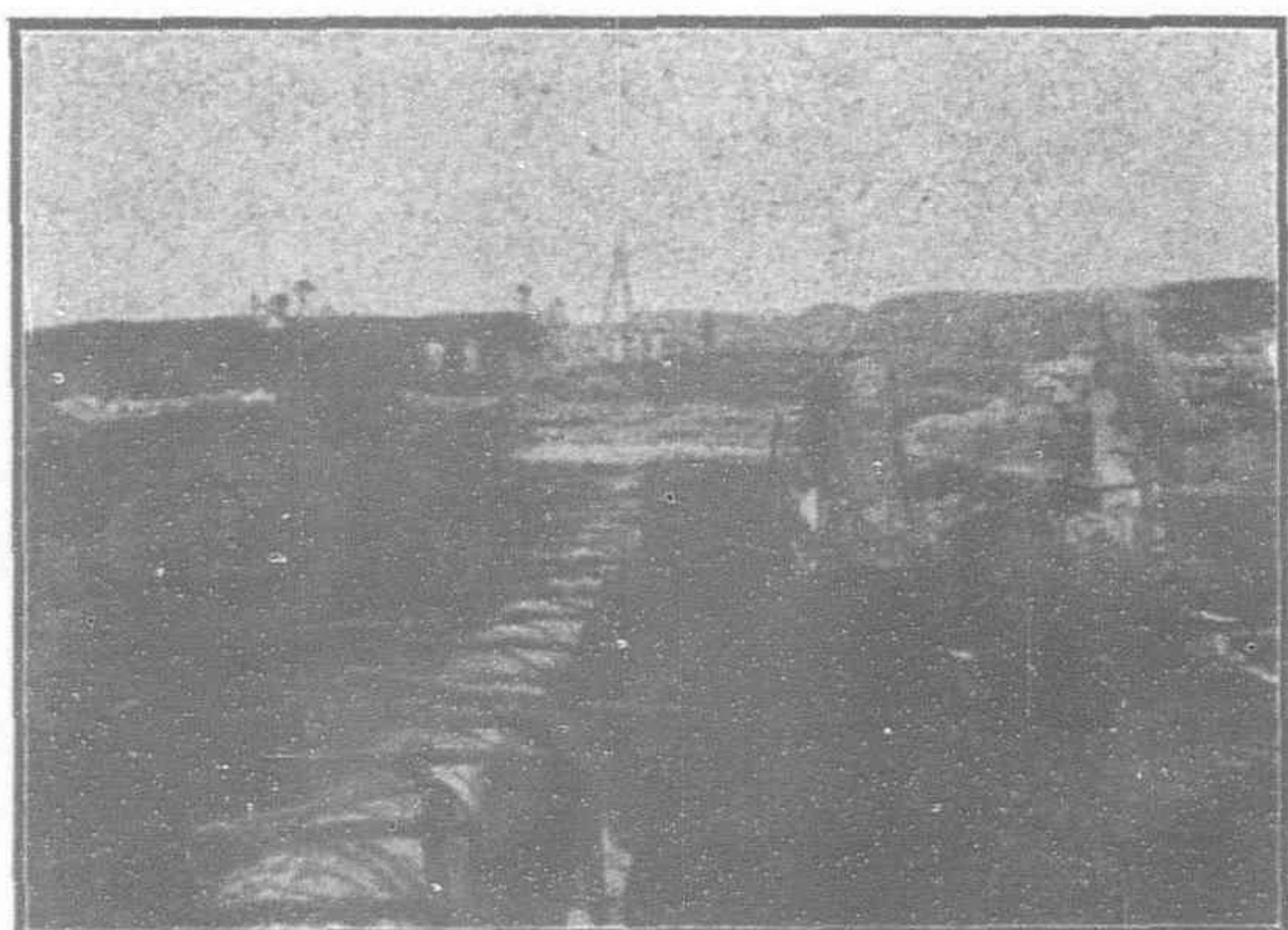
Excellent waterworks now exist at Seoul, Chemulpo, Fusan, and Pyongyang, involving an expenditure of \$3,935,000, and others are in course of construction or projected for nearly all of the principal towns of Chosen.



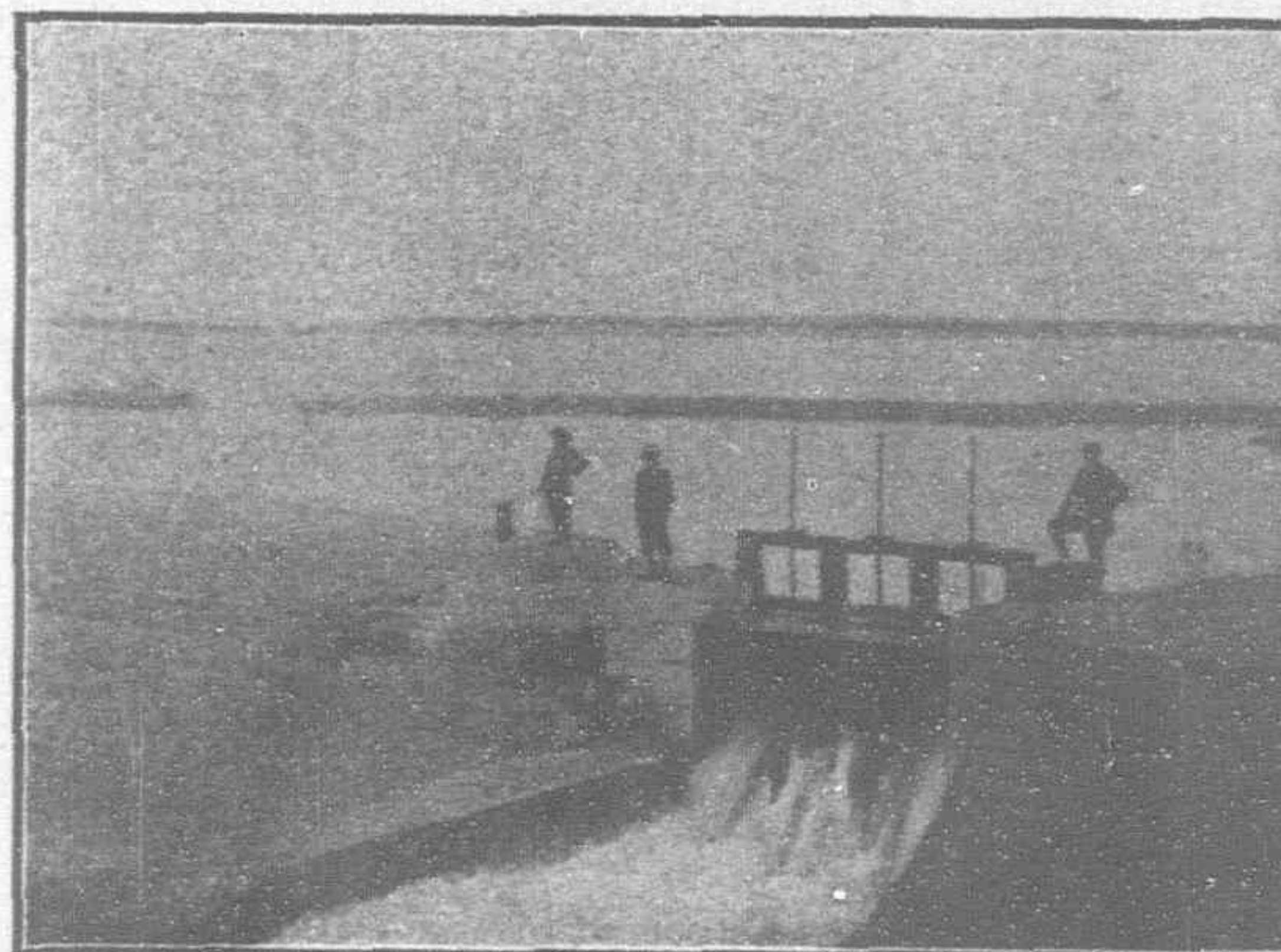
The Yokyo Water Reservoir, maintained by the Rinyeki Water Conservation Association.

Work on the large tidal basin and docks at Chemulpo is progressing rapidly. At the end of the year 1912 about \$565,000 had been expended on it, and four more years are given as the period required for its completion, at a total estimated cost of \$1,734,730. The manufacture of salt by evaporation is mainly a Government enterprise in Chosen and the areas of pans are being extended.

To supply the demand of the Korean market large quantities of crude salt are imported from the Kwantung Province of China and refined by private firms at Chemulpo. In May, 1912, heavy storms caused great damage to pans along the Korean coast and reduced the expected output. The total amount of Korean salt produced during the year 1912 is reported as 14,832,087 pounds.



Drain pipe route constructed with wooden tubes by siphon process.



The first barrage.

were religious and 1,044 secular. Figures recently published show the very creditable results accomplished by Chosen in lighting its coasts in comparison with other parts of the Japanese Empire. In Japan proper there are 137 old-style and 92 new-style lighthouses; in Formosa, 9 old-style and new-style; in Chosen, 14 old-style and 59 new-style.

STEAMSHIP SERVICE, HARBOR WORKS, SALT INDUSTRY, ETC.

In March, 1912, a number of small steamship companies engaged in the coastwise trade were amalgamated under the name of the Chosen Yusen

The construction of a naval station and new city at Chinhai (Masampo) is being pushed with great vigor by the Japanese authorities and its population is rapidly increasing. It is predicted that this place will soon become one of the most important commercial and industrial towns of southern Chosen. The navy yard there will probably be completed during the year 1914.

A noticeable item among the imports into Chosen from the United States during the year 1912 is that of salted herrings, the value of which was \$128,490. This indicates that the rich sources of supply of fish on the Korean coast are not yet properly exploited.

CHINA'S REVISED BUDGET

The total revenue for the second financial year (July 1913-June 1914) as estimated in the original Budget of the Republic of China, was \$646,358,109, and that of the revised Budget is \$557,296,145, thus showing a decrease of \$89,061,914. The total annual expenditure was estimated in the original Budget at \$646,358,109, and in the revised Budget at \$642,236,876, showing a decrease of \$4,121,233. This reduction is due to causes explained as follows by the Ministry of Finance:

"Under the figures given in the schedule of revenue of the original Budget, the heaviest item is that for loans. It is divided into two categories, e.g., (1) Foreign Loans, amounting to \$199,000,000 and (2) Domestic loans, amounting to \$129,800,000. In the case of foreign loans the amounts are fixed and can be relied upon. As regards domestic loans (\$129,800,000) whether the amount provided for can be

obtained in full is difficult to foresee. When the annual expenditure had been on the previous occasion estimated at such an enormous figure, and the deficit was correspondingly large, the amount of the domestic loans was simply entered as a method of balancing the receipts and payments. Under the present conditions, we must, however, admit that this income cannot be relied upon in full. It would be more advisable as a means of averting the present financial danger to expose the deficit to the people and thus appeal to their aid in rendering relief to the situation, than it would be to manipulate imaginary figures, regardless of facts, in order to cover over the deficiency. Thus, the revised Budget provides only \$15,000,000 for domestic loans and correspondingly reduces the total amount of receipts.

"With regard to the other items, the receipts

from land tax have been increased by about \$3,522,000; the customs duties, by about \$4,246,000; the salt gabelle, by about \$953,000; the likin, by about \$503,000; the general and other taxes, by about \$671,000; the general and other fees, by about \$258,000; and the sundry receipts, by about \$7,958,000, making a total increase of \$18,111,000. As a matter of fact, this increase cannot offset the amount by which the receipts under the Domestic Loans have been reduced. Though the separate items of receipts have been increased, yet their total in the Budget represents a smaller figure. This is the explanation for the reduction in the annual receipts.

"Regarding the figures given in the schedule of expenditure of the original Budget, the item for loans also takes up the greatest portion, amounting to nearly one-half of the annual expenditure. This item consists of payments

on account of foreign loans for this year of about \$131,600,000; payment of foreign indemnities for the last year entered as arrears for the present year of about \$10,300,000; the redemption of loans paid from the "Re-organization Loan" of about \$107,800,000; payment for the redemption of short term loans of the central government within this year of about \$3,800,000; payment for the redemption of Domestic loans of about \$47,100,000. Excepting the payment of foreign long term loans of about \$50,000,000; for indemnities of about \$30,000,000, and for Domestic loans of about \$8,000,000; the remaining items of expenditure are all for the special expenses of this year.

"The next item in the order of importance is that of military expenditure. In the original Budget, the expenditure estimated for military affairs was given at about \$130,000,000 and for the disbandment of troops at about \$27,000,000, making a total of \$160,000,000. At first, we attempted to strictly reduce this expenditure, but owing to the sudden outbreak of the second revolution, the policy of disbanding the existing troops could not be put into effect, and, in addition to this, the expenses for recruiting had to be increased. Thus in the revised schedule prepared by the Board of Army, the expenditure has been increased by about \$2,100,000 as compared with the amount originally estimated. Furthermore, the expenditure for the internal administration of the provinces had increased as a natural result of the disturbance and in order to preserve the peace of the localities, additional land and river police forces were formed, and, funds for charitable purposes had to be contributed to relieve the people in the disturbed districts. So that the estimated expenditure of the Board of Home Affairs, has correspondingly increased.

"With regard to the expenditure of the different Boards the expenses for the Board of Foreign Affairs have been reduced by about \$518,000; the Board of Finance, by about \$3,800,000; of the Board of Law, by about \$3,846,000; the Board of Education, by about \$237,000; the Board of Agriculture and Commerce (which is an amalgamation of the Board of Agriculture and Forestry and the Board of Industry and Commerce), by about \$1,838,000, and that of the Navy, by about \$10,000. Excepting the Board of Communications whose expenses have been slightly increased for providing an increase in the railway police service, the total amount of expenses of the Boards has been decreased by about \$10,240,000.

Taking the expenditure as a whole, the amount of expenses curtailed under the different Boards may equalise the amounts increased for the Board of Home Affairs and the Board of Army. This is the explanation for the reduction in the expenditure.

"In balancing the annual receipts and expenditures, there is a deficit of \$84,940,731. To devise some means of meeting this deficiency is, of course, the duty of this Board, but as the deficit shown in the Budget, is a matter of assumption and the balance between the revenue and expenditure is based upon a theoretical calculation, it is earnestly hoped that all the officers will adhere strictly to the policy of limiting the expenditure to the revenue, or, in other words, to maintain an equal balance between the expenses and the receipts, so that, in this way, the finances of this country may gradually be improved."

Total Receipts \$557,296,145.
 „ Expenditure 642,236,876.

Total Deficit \$ 84,940,731.

ANNUAL REVENUE

ORDINARY

Land Tax.

1 Land (and Poli) tax	\$57,813,927
2 Grain tribute com- muted	16,732,771
3 Ground rents ...	3,244,556
4 Miscellaneous ...	1,389,468
	<u>\$79,180,722</u>

Salt Gabelle.

1 Salt Tax and Likin	39,758,706
2 Surtax	22,622,419
3 Miscellaneous ...	1,918,820
4 Receipts from Gov- ernment transport- ation service ...	298,889
5 Additional Surtax	578,454
6 Sundry	2,681,088
7 Additional duties...	888,835
7 Profits	7,586,890
9 Sale of Merchants Licences	1,067,164
	<u>77,401,265</u>

Customs.

1 Native Customs ...	9,728,832
2 Maritime Customs	57,241,171
	<u>66,970,003</u>

Likin.

1 General Likin ...	22,906,670
2 Consolidated tax (T'ung Ch'ian) ...	4,118,236
3 Miscellaneous Likin	5,679,900
	<u>32,704,806</u>

General and Miscellaneous Taxes.

1 Title deed tax ...	12,223,184
2 Pawnshop tax ...	660,394
3 Tobacco, spirit and sugar tax	10,250,842
4 Mining tax	1,709,238
5 Brokers' tax	621,003
6 Tea tax	666,229
7 Stamp tax	980,000
8 Income tax	2,175,000
9 Tobacco and spirit licence tax	2,175,000
10 Consolidated tax ...	4,070,174
11 Fishmongers' tax...	141,320
12 Sundry	2,189,776
	<u>37,862,160</u>

General and Miscellaneous Licence Fees.

1 Tobacco and spirit licence fees	1,745,561
2 Brokers' licence fees	59,415
3 General licence fees	305,084
4 Pawnshop licence fees	145,471
5 Sundry	1,555,641
	<u>3,811,172</u>

Receipts from Government enterprises.

1 Income from Gov- ernment enterprises	7,050,207
2 Interest on Govern- ment investments...	799,405
	<u>7,849,612</u>

Miscellaneous Receipts.

1 Legal fees	6,650,027
2 Interest on public moneys (Govern- ment funds)	767,363
3 Collection fees ...	863,571
4 Sundry receipts ...	4,104,852
	<u>12,385,813</u>

Total Ordinary Annual Revenue \$318,165,553

EXTRAORDINARY

Land Tax.

1 Sale of waste lands	\$ 1,822,055
2 Colonization (K'en Wu)	138,976
3 Miscellaneous ...	1,261,857
	<u>\$ 3,222,888</u>

Salt Gabelle.

1 Salt tax	2,162
2 Fines	8,065
3 Miscellaneous ...	154,042
	<u>164,269</u>

Customs.

1 Native Customs ...	1,026,847
2 Maritime Customs	227,433
	<u>1,254,280</u>

Likin.

1 Fines	3,214
2 General Likin ...	2,166
3 Miscellaneous ...	674
	<u>6,054</u>

General and Miscellaneous Taxes.

1. Sundry taxes ...	417
	<u>417</u>

General and Miscellaneous Licence Fees.

1 Brokers' Licence fees	33,412
2 Pawnshop Licence fees	99,000
	<u>132,412</u>

Receipts from Government enterprises.

1 Income from Gov- ernment enter- prises	634,093
	<u>634,093</u>

Miscellaneous Receipts.

1 Disposal of public properties	2,353,559
2 Refund of public moneys	170,479
3 Fines	1,438,236
4 Interest on public moneys	353,841
5 Collection fees ...	512
6 Sundry receipts ...	352,765
7 Title Deed regis- tration fees	5,446,475
	<u>10,115,867</u>

Contributions.

1 Contributions from official emoluments (Pao Hsiao)	97,494
2 Compulsory contri- butions (Chin Tieh)	1,238
3 Public contributions (Kuo Min Ch'ian)...	131,576
	<u>230,308</u>

Loans.

1 Foreign Loans ...	208,370,000
2 Domestic Loans ...	15,000,000
	<u>223,370,000</u>

Total Extraordinary
Annual Revenue \$239,130,592

Total of Ordinary and
Extraordinary Annual Revenue \$557,296,145

ANNUAL EXPENDITURE

ORDINARY

Under the Board of Foreign Affairs.

1 The Board proper... \$	585,196
2 Legations abroad...	1,857,900
3 School of Russian Language	42,204
4 Provincial Ex- penditure	807,815
	<u>3,293,115</u>

Under the Board of Home Affairs.

1 The Board proper	578,559
2 Offices in Peking ...	3,469,096
3 Provincial Civil Ad- ministrators' offices	4,733,124
4 Intendants' offices...	2,385,067
5 Magistrates offices	16,965,608
6 Police in provincial Capitals and treaty ports and marts (in- cluding police sub- sidies)	2,799,275
7 River police in the provinces	5,782,373
8 Treaty ports and various construction works	2,244,462
9 Ritual ceremonies in the provinces ...	12,880
10 Agricultural settle- ments and inspec- tion of Government and private lands in the provinces... ..	133,890
11 Pacification and ar- rests of criminals in the provinces... ..	184,524
12 Sanitary, charitable and other expenses in the provinces ...	155,721
13 Relief expenses on frontiers	173,570
	<u>39,618,149</u>

Under the Board of Finance.

1 The Board proper and offices under its direct control... ..	774,860
2 Offices in Peking	6,996,099
3 Salt Administration	8,271,778
4 Shui-wu Ch'u and Maritime Customs	8,536,293
5 Native Customs	1,114,366
6 Imperial pensions... ..	6,000,000
7 Allowance to Bannermen and Ching Tombs	9,633,970
8 Provincial expenses	11,265,878
9 Public loans	151,751,936
10 Reserve fund	6,000,000
	<hr/>
	210,345,180

Under the Board of Education.

1 The Board proper	871,946
2 Schools under the direct control of the Board	1,348,938
3 Subsidiary offices under the Board	271,862
4 Students abroad sent by the Board	341,499
5 Supplementary expenses	1,302,130
6 Provincial Expenditure	1,070,840
	<hr/>
	5,207,215

Under the Board of Army.

1 The Board proper and offices under its direct control... ..	35,953,830
2 General Staff office and offices under its direct control	1,684,871
3 Military expenses in the provinces	91,640,781
4 Military expenses on the frontiers	7,585,012
	<hr/>
	136,864,494

Under the Board of Navy.

1 The Board proper and offices under its direct control... ..	7,088,051
2 Naval expenses in the provinces... ..	577,830
	<hr/>
	7,665,881

Under the Board of Law.

1 The Board proper... \$	445,627
2 Offices in Peking	945,489
3 Judicial expenses in the provinces	13,280,709
	<hr/>
	14,671,825

Under the Board of Agriculture and Commerce.

1 The Board proper and offices under its direct control... ..	4,094,058
2 Provincial Expenditure	989,328
	<hr/>
	5,083,386

Under the Board of Communications.

1 The Board proper and offices under its direct control... ..	930,616
2 Provincial Expenditure	4,261
	<hr/>
	934,877
Total Ordinary Annual Expenditure	<hr/>
	\$423,684,122

EXTRAORDINARY**Under the Board of Foreign Affairs.**

1 The Board proper... \$	196,800
2 Legations abroad	629,000
3 School of Russian language	870
4 Provincial Expenditure	186,553
	<hr/>
	1,013,223

Under the Board of Home Affairs.

1 The Board proper... ..	966,063
2 Offices in Peking	582,501
3 River police in the provinces... ..	405,954
4 Buildings and constructions in the provinces... ..	1,662,762
5 Investigations in provinces... ..	228,176
6 Charity expenses in the provinces	53,750
7 Expenses for prohibition of opium-smoking in the provinces	87,540
8 Pacification and sundry expenses in the provinces... ..	277,114
	<hr/>
	4,263,860

Under the Board of Finance.

1 The Board proper and offices under its direct control... ..	257,615
2 Offices in Peking	963,905
3 Salt administration	20,841,671
4 Maritime Customs	2,306,975
5 Native Customs	19,407
6 Bureau of Printing	669,375
7 Special expenses provided for in the annexes of the Reorganization Loan contract	7,084,392
8 Provincial expenditure	438,803
9 Public loans	148,986,471
	<hr/>
	181,568,614

Under the Board of Education.

1 The Board proper... \$	25,000
2 Schools under the direct control of the Board	1,380,675
3 Subsidiary offices under the Board	182,400
4 Students abroad sent by the Board	54,580
5 Provincial expenditure	58,980
	<hr/>
	1,701,635

Under the Board of Army.

1 The Board proper and offices under its direct control... ..	19,839,921
2 The General staff office and offices under its direct control	505,747
3 Military expenses in the provinces	4,713,974
4 Military expenses on the frontiers	1,850,876
	<hr/>
	26,910,518

Under the Board of Navy.

1 The Board proper and offices under its district control	1,307,014
	<hr/>
	1,307,014

Under the Board of Law.

1 The Board proper... ..	279,012
2 Offices in Peking	74,900
3 Judicial expenses in the provinces	16,400
	<hr/>
	370,312

Under the Board of Agriculture and Commerce.

1 The Board proper and offices under its direct control... ..	569,570
2 Provincial expenditure	390,165
	<hr/>
	959,735

Under the Board of Communications.

1 The Board proper and offices under its direct control	119,960
2 Provincial expenditure	337,983
	<hr/>
	457,843
Total extraordinary annual expenditure	<hr/>
	\$218,552,754
Total of Ordinary and Extraordinary Annual Expenditure	<hr/>
	\$642,236,876

RAILWAY PASSENGER TAX IN CHINA*

[BY CHING-CHUN WANG, PH.D. IN C.E., PH.D.,
VICE-CHAIRMAN OF THE COMMISSION ON THE
UNIFICATION OF RAILWAY ACCOUNTS
AND STATISTICS.]

Recently we have heard a good deal in connection with the announcement that China intended to follow the example of England, Germany, and other European nations in imposing a tax on railway tickets. That is, when a passenger buys his ticket he will be required to pay an extra charge equal to about 5 to 15 cent. of the fare. While admitting the necessity of securing revenue from every possible source in order to ameliorate the present financial stringency, and putting aside the political questions involved in such a matter, we propose to examine the question of imposing such taxes on railway tickets from a railway and economic point of

view. In so far as what China intends to do in imposing such a tax is to follow the example of the West, we may, first of all, examine under what conditions and in what spirit some of the Western nations actually impose that tax.

Beginning with England, we find it has been imposing such taxes on railway passengers for years. During the early part of the 19th Century, when the principal means of land transportation was the stage coach, duties were levied on passengers for various purposes. When railways were invented, in the early part of the last century, they were placed under the same category as the highways and stage-coaches, and accordingly the existing laws of levying duties on passengers were made to apply to this new means of transportation.

The first law governing the imposition of duties on railway passengers, was passed in the reign of William the Fourth. This Act was repealed in 1842, and a new law passed (5 & 6 Vict. Cap. 79), which provided that a duty of 5% should be levied upon all sums received for the conveyance of passengers and that the proprietors of the railways were held responsible under penalty, for the proper payment of these duties.

In 1844, another law was enacted (7 & 8 V. C. 85 S. 9) which provided that no tax should be levied upon the receipts of any railway company for the conveyance of passengers at fares not exceeding one penny per mile. This act was amended in 1863 (26 & 27 Vict. C. 33). It was amended again in 1883 by the Cheap Trains Act (46 & 47 Vict. 34), which provided that fares not exceeding the rate of one penny per mile should be exempt from all duty and that the duty on fares exceeding the rate of one penny per mile, for conveyance of passengers between stations within one urban district, was reduced to 2%.

Briefly, the above is the development of the law in Great Britain governing passenger duties. The railways in fixing their fares constantly keep in mind these impositions. The Government, however, gets very little from this source of taxation. Taking 1911 as an example, while the gross passenger receipts were about £53,000,000, the total passenger duty collected amounted only to about £300,000, which is about one-half per cent. of the gross receipts. This is due to the fact that on account of sharp competition and in order to develop the passenger traffic, the British railways have so reduced their fares that practically

*Substance of a memorandum submitted to the China Railway Association, by Dr. C. C. Wang at the request of that organization.

only first class traffic is now liable to this tax. As the great majority of the people travel 3rd class and the gross receipts from 1st class traffic are comparatively insignificant, this tax is becoming nominal. Thus out of a total number of 1,326,316,990 passengers carried by the railways in 1911, only about 30 million, or less than 2.5%, were 1st class passengers. In other words, the British Government only tax a very small fraction of her well-to-do travellers, who do not mind paying for extraordinary luxury or "dignity," while the great majority of the people are exempt from this duty by travelling 3rd class. It must be pointed out here, however, that the 3rd class accommodations and facilities in England compare favourably with those of many 1st class carriages in the East.

On account of the fact, that the people in Ireland are financially less favourably situated than the people in England and Scotland, and that in order to avoid running the risk of arresting the necessary amount of travel in that island, as well as for some other reasons, the British Government decided from the beginning to exempt Ireland from all these duties.

From the above, it may be seen that this tax has not only failed to bring to the British Government the expected amount of revenue, but also has proved very unpopular. In fact, I am authoritatively informed that there is a movement on foot to abolish the duty entirely, and those who are familiar with British railway affairs know that the work of the Travelling Tax Abolition Committee and other organizations, whose object it is to hasten the unconditional abolition of railway passenger duty, is making much progress.

Turning to Germany, we find similar results as in Great Britain. Of all the nations which have State railways, Germany is acknowledged to be the most successful. In Germany the "Imperial Ticket Tax," as duties on passengers are called, ranges from about two per cent. on tickets of the 3rd class to something like 15% on long distance tickets of the 1st class. The 4th class, however, is exempt from this duty, thus making the higher classes pay more. As to the result of the experiment, I cannot do any better than to repeat what a German railway authority, with much personal experience and knowledge about this tax, once wrote to me. This gentleman stated that taxes are nowhere popular, but no tax has been so unfavourably received in Germany as that on railway tickets. Soon after the introduction of this form of taxation, a popular movement was made to obstruct it. To show their opposition, the people organized many societies for the special purpose of defeating the law. A rush was set in, and higher class travelling went to lower classes. As a matter of fact, 1st class paying passengers are now almost unknown in Germany, and 2nd class travelling shows a great decrease, while 3rd class travelling has extended very much. More than that, the 4th class, which formerly was only patronized by the labouring people "is now crowded," to quote the exact words, "by passengers of all standing." This change of habit to travel by lower classes, besides reducing railway revenue, has affected the receipts of the ticket tax, which in 1906 were about \$3,000,000 less than estimated.

As the railways are owned and operated by the State, and all receipts, whether in the form of duty or fares, ultimately go into the State Treasury, the net result of this imposition of duty and decrease in railway revenue must be obvious. Thus not only the Government's expectations from the tax are not fulfilled, but it has to bear considerable losses in the actual fares, to say nothing of the irritation which the tax has produced among the people. As a result of their experience, both the Government and Parliament are planning, we understand, to abolish this tax at an early date.

From this brief sketch of the development and spirit of the application of the law concerning passenger duty in Great Britain and Germany, we may see that the fundamental principal underlying the whole question of passenger duty in these two countries is, on the

one hand, to tax those who want to travel with exceptional luxury, with whom a duty of 5 or 10 per cent. on the fare does not enter into much consideration, while on the other hand, to exempt from this duty the average people who need to travel and who call only for comfort and convenience rather than luxury. As the writer is requested only to find out what these three countries are doing in this respect and under what conditions it is done, he will not give any opinion as to whether China should follow the example of Germany and Great Britain to introduce this form of taxation or to follow America in avoiding it, because he feels that in this matter as well as in many other things, indiscriminate copying or imitation is often dangerous. He wishes to emphasize, however, that should China decide to follow the example of Great Britain and Germany in introducing this duty, she cannot over-emphasize the fact that she should also constantly keep in mind the spirit of the British law and the practice of the German Government, in taking into consideration the paying capacity and the urgent need of more travel of the people, so that the middle and poorer classes, who have already more than their handsful in carrying on their uphill struggle, may be exempt from this additional burden.

Furthermore, the fact that there are such active movements in both Germany and Great Britain, in favour of the abolition of this duty after considerable trial, also reminds us to be especially careful not to introduce a foreign institution which may soon be discarded by its originators.

It must also be pointed out that the general rise in fares which will naturally follow the introduction of the duty will have two effects. First, it will reduce or "kill" what is called pleasure travel; secondly, where the general level of fares is comparatively high, and where there is more than one class of service, as in China, such a general rise in fares is likely to lead people to avail themselves of the lower classes, as actually took place in Germany. Insofar as we have practically no pleasure travel, we have not much fear from the first effect. From the second effect, probably we cannot escape, and the net result will probably be that the total receipts from both fares and duties after the imposition of the tax will not very much exceed the former normal receipts from fares alone. The only difference will be that more people will crowd into the crowded third class, which certainly is a condition to be avoided. Indeed, it is worth while to-day to consider whether it is advisable to lower the standard of travel of the people.

This leads us to conclude, that after all the advisability or otherwise of the imposition of such a duty, when considered from an economic point of view, largely depends upon two factors, i.e.—the existing level of fares and the comparative paying capacity of the people. We, therefore, give a table which contains the approximate figures of the average fares for the different classes in various foreign countries: (See table I. next column).

From this table it may be seen that by casting aside the differences in accommodation and in the purchasing power of the dollar, &c., the class fares in China are only a little less than in France, Belgium and England, while they are considerable higher than in all other countries cited in the table. Moreover, in the case of the 2nd and 3rd class fares, ours are about 40 per cent higher than those of Japan, and more than double of India. Insofar as the travelling conditions and earning capacity of our people are similar to those of India and Japan, and also insofar as most of our people travel second and third class, this comparatively high level of fares must be a serious obstruction to the proper development of passenger traffic in China.

But our comparison of fares in different countries will be misleading if it is made only upon the basis of the ordinary class fares, for a great proportion of the passengers do not travel by the class fares. Excursion and numerous other exceptional fares, which are usually very much cheaper than the class fares,

Country.	Approximate capital outlay of line per mile, in dollars.	Approximate average fares per mile including ticket duty, in cents.			
		1st	2nd	3rd	4th
England	600,000	6.5	4.3	3.8	
France	356,000	6.5	4.3	2.8	
Belgium	264,000	5.6	3.8	2.3	1.5
Germany	149,000	5.3	3.4	2.3	
America	150,000	3.9			1.3
Austria	210,000	5.0	3.0	2.2	
Russia	160,000	5.0	3.0		
Japan	86,000	4.6	2.7	1.5	
India	90,000	4.2	1.8	0.8	
China	80,000	5.4	2.6	2.0	

There is an intermediary fare between 2nd and 3rd.

and which are little known in China, have been developed so extensively in many foreign countries during recent years, that the average fare actually paid by the ordinary traveller is usually much below the class fares.

Beginning with England, we hear much of the "penny-a-mile" 3rd class fare. But many people overlook, or are ignorant of the fact, that these class fares are conspicuous only by their absence. Indeed, competition has been felt so keenly by the railways in England, that these class fares are adopted only in rare cases, while the great bulk of travellers go by reduced fares.

To show the nature of these reduced fares we may take the 3rd class excursion day fare of 3/- from Manchester to Blackpool, as an example. The distance is 49 miles, which makes the return trip 98 miles. The ordinary class fare is about 8/- or four cents per mile, while the excursion fare gives the passenger the privilege of travelling at a trifle over 1.3 cents per mile by some of the best trains of the World, every day in the year. The Great Central Railway Company, which is known as a go-ahead concern, has recently introduced the attractive fare of 3/3d from Manchester to Cleithorpes, a distance of 103 miles in each direction, which represents about 0.8 cent per mile and which has attracted a great many people to travel between these places. In addition, there are the numerous half-day and day excursion fares, short period tickets, short and long date week-end excursions, long distance excursion fares, picnic and pleasure-party fares season tickets, suburban coupons, &c., &c., each of which means reduced fares.

These examples are by no means exceptional cases. In fact similarly low fares are in use over all the lines, and it is by these low fares that a great portion of the passengers are carried and the dense passenger traffic in England is built up.

Belgium—What is true in England is similarly true in many other countries. Thus comparing our fares with those of Belgium, we must first of all point out that the Belgian fares are fixed on the zone or tapering basis, that is the longer the distance the less the fare per mile. On the surface, we notice our class fares are a little lower than those in Belgium. But in this case, as it is in that of Great Britain, we must say that such a comparison is at least incomplete if we overlook the numerous reduced fares, such as the return class fares, school tickets, tickets available for 5 or 15 days, or for 3, 6, 9 or 12 months over all the railways of Belgium, and other season and excursion tickets, all of which reduce the fares considerably below the class fares.

Austria and Hungary.—In Austria, the ticket-tax ranges from 6 per cent. on the "Lokalbahnen," or branch lines, to 12 per cent. on the "Hauptbahnen" or trunk lines. There is no uniform system of fixing fares, but in many cases the zone system is adopted, according to which the fares are calculated in zones of 10 kilometres; each portion of 10 kilometres being considered as 10 km., and the longer the distance the less the fare unit. Thus, while for distances from 1 to 100 miles the 1st, 2nd and 3rd class fares are 5.0, 3.0 and 1.6 cents per mile respectively; for distances over 200 kilometres, they are 4.7, 2.7 and 1.3 cents per mile, while for distances over 400 miles, they are 4.4, 2.6 and 1.1 cents per mile respectively.

In Hungary, the ticket tax also ranges from 6 per cent. to 12 per cent. Like in Austria, the fares are mostly on the zone basis. The distances are divided from each station into specific zones, within which, in the fixing of fares, each distance up to the limit of the zone is calculated. The first 50 kilometres, is divided into five zones of 10 kilometres, each, the next 30 kilometres into 2 zones of 15 kilometres each, the next 20 kilometres forms one zone by itself, and the next 100 kilometres is again subdivided into four zones of 25 kilometres each, thus the first 200 kilometres, is divided into twelve zones of different sizes, beyond which distances are divided into zones of 50 kilometres each. The fares are also similar to, but lower than, those of Austria, being less for the longer distances.

India.—In India, the Government, with the help of a technical staff and with the advice of the Railway Conference Association, fixes the maximum and minimum fares. The practice there has been to encourage traffic by low fares, as shown by the figures in the previous table, and the result has given every satisfaction. Since the introduction of the low fares in 1884, the number of passengers has increased almost three-fold, while the total amount of receipts has more than doubled itself. These results certainly commend themselves to the serious consideration of railway administrators.

From the above it may be seen how misleading it will be, if we simply compare the ordinary class fares and overlook the real traffic conditions in the different countries. And it is safe to say that when we take these reduced fares into consideration, we shall find that fares in China are not any lower than in France and England and that they are considerably higher than in Germany, the United States, and many other countries.

In comparing the fares of the different countries, besides taking the special fares and difference in traffic conditions of the different countries into consideration, we shall also keep in mind the differences in the purchasing power of money in these countries. A dollar, if we take it as the unit of comparison and as being equal to fifty cents U. S. Gold, two German marks or two shillings of English money, generally speaking can purchase about three times as much in China as it can in Europe or America; that is, if we can purchase three dozen eggs, or three pounds of beef in the United States with one dollar, we shall be able to buy about nine dozen eggs or nine pounds of beef in China. In other words, what costs three dollars in Europe or America should cost us no more than one dollar here. In so far, as railway transportation is but a commodity for sale by the railways, to be

purchased by the travellers, then if a mile costs three cents in Europe or America, it should cost no more than one cent in China. Thus in comparing the different fares or rates, it is not the dollar itself, but the purchasing power of the dollar that forms the proper unit or basis of comparison. Since this is so, although the two cent per mile, third class fare in China as set forth in the above table, is 0.8 of a cent less than that in France and 1.9 cents less than in England when measured by the dollar, it really is almost three times as high as those in the two countries mentioned if it is properly measured by the purchasing power of the dollar. To this difference of the purchasing power of the dollar in China and elsewhere, if we add the difference of the earning or paying capacity of the people, we can readily see that the difference between our fares and those in Europe and America is enormous and that if we experiment with any changes of our railway fares at all, we should unquestionably lower them first rather than raise them. In so far, as the reducing of fares invariably increases the amount of traffic, the experiment of lowering our fares may not necessarily result in the decrease of our net railway receipts, in which case it will mean the net beneficial result of having more people enjoy the advantages of travel with the same net returns to our treasury. On the contrary, if properly managed, a proper reduction of fares may even bring more net revenue to the railways, as has often been the case elsewhere. Then again, it is clear, that when the economic and social conditions of the average people are taken into consideration, our fares should not be based upon the existing fares in England or France, where the purchasing power of the dollar and the earning or paying capacity of the people are so different from ours, but rather be guided somewhat by the fares in India and Japan, where economic and operating conditions are more similar; or perhaps better still, to strike a middle course between the two extreme cases instead of following either.

This, of course, leads to the question of considering the fares from a proprietary point of view; that is the Government or the companies as owners of the railways, have a right to charge a fare which will bring to them a reasonable return on the amount of money, which they, as proprietors, put into the railways. In this case, besides taking the rate of interest on the investment the usual way of comparison, is to take the cost per mile of line as a basis. By referring to the first column of figures in the previous table, we may see that the capital outlay per mile in China is considerably less than in Europe or America and hence the fares should also be less. Moreover, if the proprietors may make fares by using the cost of the line as a basis, the passengers may also use the fares as a basis for demanding travelling facilities and accommodation. If we consider the question from the latter point of view, and since our first class accommodation is not much better than foreign second class facilities, and our second class is certainly worse than foreign third class, the travellers may say that we should compare our first class with foreign second class and our second class with their third class fares and not the corresponding classes.

We must also add, that in the administration of railways, especially where the State furnishes the capital, the Government should constantly bear in mind that on the one hand the railways do not lose any revenue by quoting

unduly low rates and on the other hand the public is not oppressed by too high charges so as to arrest the necessary development of industry and commerce. In so far as China is the only country which has no law for the regulation of rates and fares, it becomes important that the whole situation, especially the paying capacity of the people and the existing comparatively high rates, should be taken into careful consideration, before introducing such a tax at the risk of arresting traffic development.

When we take the foregoing facts into consideration and notice that such a tax will not bring much revenue, as shown by the experience of other countries imposing such a tax; that there is a great need of development of passenger traffic in China, and that there are constant quarrels between the station masters and the travellers on account of making the small changes of money in the purchase of tickets, which fact is well known to any traveller, we doubt very much whether we should add another factor of small changes of money by imposing this tax and introduce one more factor of irritation, by making the railway authorities assume the repulsive duty of tax collectors and loading the people with the additional burden of being taxed for going about.

If the Government is earnest in its desire to get more money out of the railways it can do no better than to abolish all likin and other troublesome taxes along the railways. These barriers create much trouble for the railways and give most undesirable obstacles to the business men, while producing but little revenue for the Government. Indeed, likin, worse than all other drawbacks, is interfering most seriously with the development of traffic, and hampering domestic trade in China.

Upon the abolition of these obnoxious barriers, the Government can easily require the railways to guarantee to pay to the Government the same or even greater amounts than what are now paid by these numerous barriers. By so doing, the Government will not only be able to increase considerably its likin revenue and its railway receipts, but will also be rendering a great service to trade. Since what the merchants hate is not so much the payment of the likin charges as the trouble and unreasonable exactions which the likin collectors impose under the excuse of these charges, the abolition of these barriers and the guarantee of the likin revenue by the railways will bring considerably more revenue to the Government on the one hand and prove a boon to trade. As soon as these taxes are abolished goods traffic is bound to grow, which will again bring more prosperity to the country and more railway revenue to the Government, the net result of both of which facts will be to China's increasing advantage. By imposing the ticket tax we can get very little money and we shall be creating opposition among the people, while by abolishing likin along railways we shall be helping all people and incurring the displeasure of only the likin collectors. Instead of trying to scrape up a trifling sum of money by irritating millions of travellers and good business men, as well as discouraging trade, why not try to create a source of increasing revenue by this beneficial means? This is what the writer desires strongly to recommend to the consideration of the authorities in charge of finance and transportation.

PEKING PRINTING AND ENGRAVING BUREAU

The Bureau of Printing and Engraving at Peking has been operated for some considerable time at a loss. As the Bureau is considerably in debt to the American Bank Note Company an offer has been made by the latter to take over the Bureau. The company is willing to lease the existing machinery, instal whatever additional plant may be required and to enter into an arrangement to print the Government's bonds, notes and stamps.

EXTENSION OF THE DAIREN WATERWORKS

The work of laying a light rail line, about 8 miles in length, from West Shahokou to Malantun, where the water source of the city's Waterworks is situated, was started by the Japanese contractor yesterday, says the *Manchuria Daily News* of April 6. The light rail line is to be used for carrying supplies required for the extension of the equipments at the water source. These supplies will be transported from Dairen as far as West Shahokou by tramway, and will be kept at a depot to be founded there for the purpose.

The construction of the dam was to be begun early in May.

CENTRALIZED CONTROL SYSTEM FOR PANAMA CANAL LOCKS

The electrical specification, design and manufacture of the Panama Canal centralized control system may properly be regarded as one of those undertakings which, from an engineering standpoint, not only arouses a lively interest but also presents an opportunity for much valuable instruction. The interest results mainly from the immensity of the Canal project itself, and the instruction from a consideration of the methods employed to insure the passage of even the largest ships afloat across the Isthmus with speed and safety. The complete operation of the Canal locks, terminals and auxiliary equipment utilizes electrical energy throughout, with the present exception of the Panama Railroad, the electrification of which is under contemplation.

The specifications for the entire generating, lock controlling and distribution system for operating the Panama Canal were prepared under the supervision of Mr. Edward Schildhauer, Electrical & Mechanical Engineer, Isthmian Canal Commission, assisted by a staff of able electrical engineers, including Mr. C. B. Larzclerc, who was closely identified with the lock control problems, and Mr. W. R. McCann with the generation and distribution of power. These specifications exhibited great care and painstaking engineering. They contained every safeguard that expert engineers could suggest, were exact and explicit in regard to the results required, yet gave proper range in the details of accomplishment.

GENERATION AND DISTRIBUTION

The power system for the operation of the locks, towing locomotives, lights for the locks and buildings, and motors not directly connected with the lock control, is composed of:

A 7,500 kv-a, 2,200 volt hydroelectric power plant at the Gatun Dam;

A 4,500 kv-a, 2,200 volt Curtis turbo-generator electric power plant at Miraflores for emergency, lately used to supply power for construction work;

A double 44,000 volt transmission line across the Isthmus, connecting Cristobal and Balboa with the two power plants;

Four 44,000 - 2,200 volt substations, stepping down at Cristobal and Balboa, and up or down at Gatun and Miraflores, depending on which of the two plants is supplying power;

Thirty-six 2,200-240 volt transmission stations for power, traction and light at Gatun, Pedro Miguel and Miraflores locks;

Three 2,200-220-110 volt transformer stations for the control boards at the locks;

Stations at Cristobal and Balboa for coal handling plants, machine shops and dry docks.

The system of connection throughout employs a double bus, double switch scheme, with provision for disconnecting any oil switch for cleaning or repairs without interrupting the circuit. In the power house and the four 44,000-2,200 volt substations, the oil switches are solenoid operated and are installed in concrete cells, above which are concrete fireproof compartments containing the two sets of buses. In the thirty-six transformer stations in the lock walls, the oil switches are hand operated. All 2,200 volt oil switches have disconnecting switches, so arranged that live parts are completely covered.

For the hand operated switches, a pipe framework supports vertical metal guides which carry the oil switch operating mechanism and slate base forming a section of the switchboard panel. On the guides a lever and toggle mechanism is mounted, by which the oil switch and slate base may be raised and lowered. Above the oil switch and mounted on the pipe framework a stationary cast iron base carries the disconnecting switch studs

and insulators. The high tension leads run to the tops of the disconnecting switch studs, and the bottom of each stud is equipped with contact fingers. On the top of each oil switch stud is mounted a contact blade. When the oil switch is raised, these blades engage the contacts on the bottom of the disconnecting switch studs, which thus in the closed position form extensions of the oil switch studs. The disconnecting switch contacts are surrounded by insulating shields which prevent accidental contact. When the oil switch is lowered, it is completely isolated from the circuit. When the oil switch is raised, it always goes to a fixed height where it is latched. An interlock prevents the oil switch from being raised or lowered unless its contacts are open, precluding the circuit being closed or opened by the disconnecting switch. In some instances another interlock makes two single-throw switches a double-throw switch and prevents both switches being closed at the same time.

For solenoid operated switches, the same form of disconnecting switch is used; but the solenoid is stationary and the connecting mechanism to the oil switch has a vertical slotted link which allows the oil switch to be raised and lowered without being disconnected from the solenoid mechanism. A mechanical interlock prevents the raising or lowering of an oil switch while in the closed position.

The instrument and control board for the Gatun Generating Station is of natural black slate, as are all the switchboards for the power system. It is totally enclosed by means of grille work with doors at each end. The switchboards for the transmission line substations are of the vertical type, with control apparatus and mimic connections symmetrically arranged on the middle section of the panels. The rear of the board is enclosed by means of grille work with doors at each end.

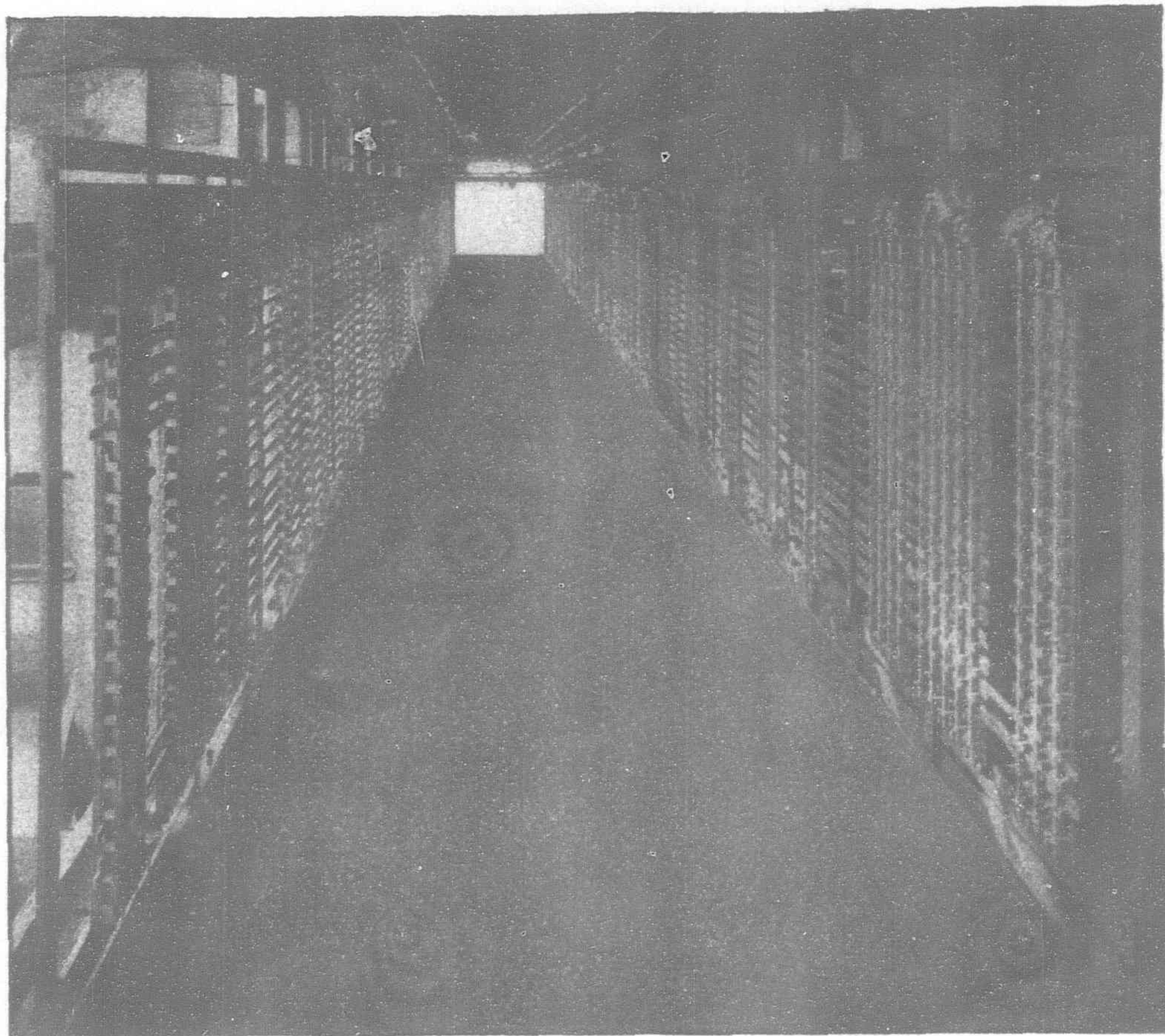
POWER SUPPLY AND CONTROL PANELS FOR LOCK MACHINERY MOTORS

Current for the lock machinery and towing locomotives is transformed from the 2,200 volt system in the immediate vicinity of where it is used. There are a total of thirty-six transformer stations, for all locks, each containing duplicate 200 kv-a, 3-phase 2,200-240 volt transformers for

power and one single-phase 25 kv-a, 2,200-220-110 volt transformer for lighting. The stations, normally fed from the 2,200 volt buses in the 44,000-2,200 volt substations, can also be operated from the power plants; the stations at Gatun locks from the Gatun hydroelectric station; and the stations at Miraflores and Pedro Miguel from the Miraflores emergency steam plant.

To give an idea of the number and sizes of motors to be controlled in operating the lock machinery, the following table is interesting:

Machines and Operation	Motors each Machine and H.P.	Number of Motors				Total Horse Power
		Gatun	Ped. M.	Mira.	Tot.	
Miter gate, moving, each leaf..	1-25	40	24	28	92	2300
Miter gate, miter forcing.....	1- 7	20	12	14	46	322
Fender chain, main pump.....	1-70	16	16	16	48	3360
Fender chain, operating valve .	1 1/2	16	16	16	48	24
Rising stem gate valve	1-40	56	24	36	116	4640
Cylindrical valve.....	1- 7	60	20	40	120	840
Guard valve.....	1-25	6	6	6	18	450
Auxiliary culvert valve.....	1- 7	4	4	4	12	84
Totals.....		218	122	160	500	12020



Interlocking System below the Miraflores Board.

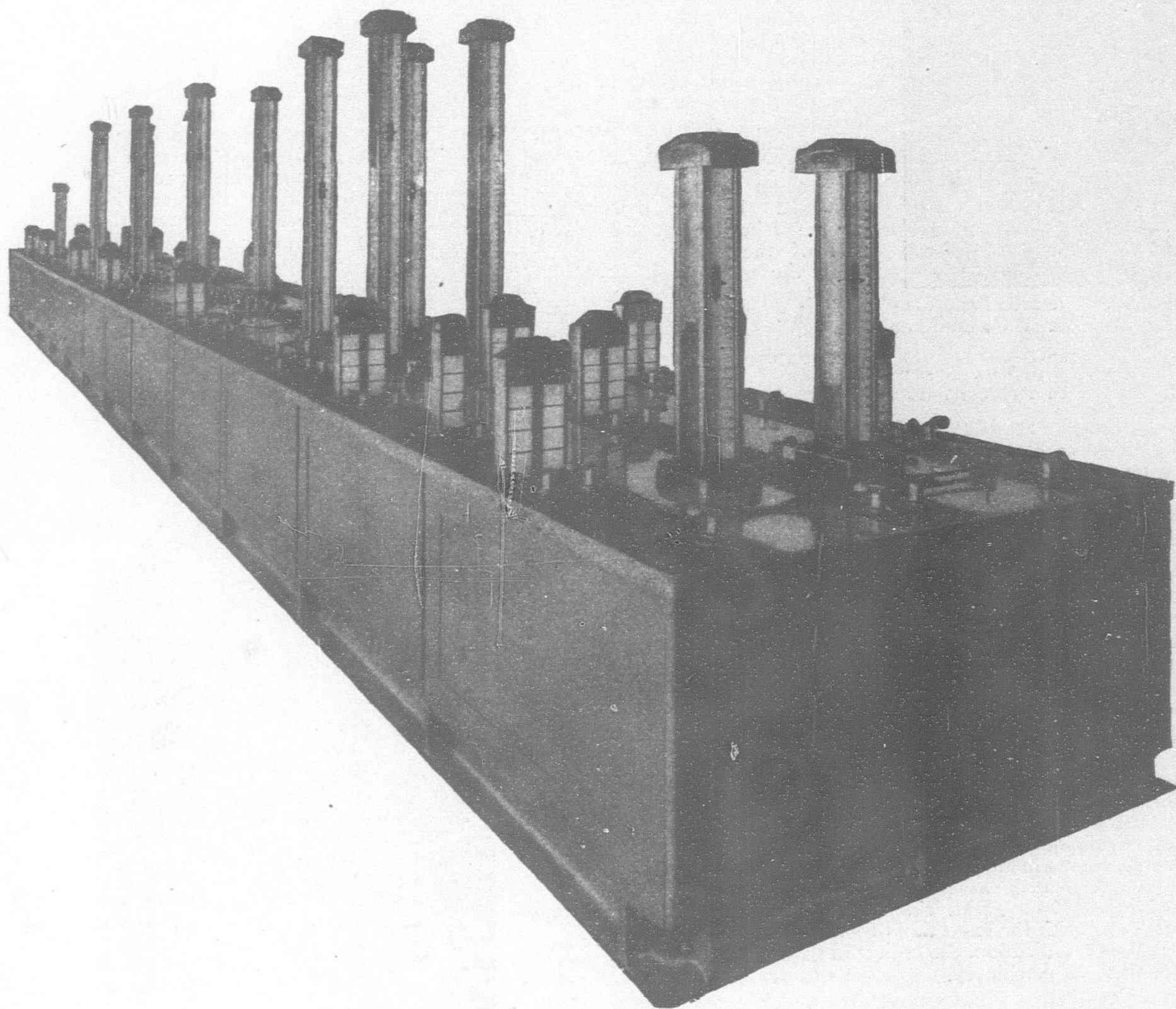
There are many motors not included above, as, for instance, those for the spillway gates, for the hand rails on the mitring gates and for the sump pumps. The spillway gates are remote controlled from a special control board, and the control of the hand rail motors is given in connection with the discussion of mitring gates.

The motors are started and controlled by contactor panels located near them, the contactors of which handle the main motor currents. These contactors are controlled from the central control house. The smaller motors, including those for cylindrical valves, auxiliary culvert valves and miter forcing, are started by being thrown directly on the line. Two double-pole contactors are used, one for forward and one for reverse. In the case of larger motors for miter gate moving, rising stem valves and guard valves, a starting point with resistance in two legs of the three-phase circuit is provided.

In all cases the contactors are operated from the control boards—to be described later—by three wires, one for forward, one for reverse and a common return. In the case of panels having a starting point, the period during which the motor remains on the resistance is automatically controlled by a dashpot, so that the starting operation at the control house is the same, simply energizing a forward or reverse wire as the case may be. The control connections are arranged in such manner that each individual

locomotives, except in the case of the lower guard gates. The hand rails are therefore made to be raised and lowered. This is done by a motor under the foot walk, controlled from the lock wall. Near the approach to each foot walk a controller is located in the lock wall flush with the surface, this controller being operated by a foot push. If the gates are closed and the hand rails are down, and it is desired to cross on the gates, the foot push is pressed and the hand rails are raised by their motors. This is true not only of the hand rails on the nearer gate leaf, but of the hand rails on the farther leaf as well. After passing across, one can, if one desires, press the foot push on the other side and both hand rails will be lowered. Or, if one leaves the hand rails up and the gates are opened by the operator in the control house, they will be automatically lowered so as to be out of the way when the gate is in the recess. When the gates are again closed, the hand rails will automatically rise again if the foot controller has been operated in the mean time. The hand rails cannot be raised when the gates are opened, and no harm results if the foot switch is operated while the gates are in the closed position.

The chain fenders are stretched across the canal in front of all mitring gates which can be exposed to the upper lock level and also in front of the guard gates at the lower end. These chains are maintained in a taut position when the gates behind are closed, and are lowered when the gates



Centralized Control Board for Miraflores Locks.

machine may be controlled locally. This arrangement provides for emergency operation should the control circuits from the central control house be out of order.

LOCATION AND OPERATION OF LOCK MACHINERY

From an operating standpoint the machinery was placed below the coping of the lock walls, thus affording a clear space for maneuvering ships and protecting the apparatus from the weather without erecting numerous houses.

The mitring gates consist of two massive leaves pivoted on the lock walls which operate independently of each other. A pair of gates is located where each change of level occurs and divides the locks into 1,000-foot chambers. In addition to these gates, at lake and ocean ends are duplicate pairs of gates used as guard gates. To handle the vessels of various sizes with the minimum use of water, mitring gates of the same description as those above are installed, dividing 1,000-foot locks into two compartments. These gates are termed intermediate mitring gates. When the mitring gates are closed they are what might be termed clamped in this position by a device called a miter forcing machine.

On the top of all mitring gates a foot walk with hand rails is provided. When the gates are opened and in the recesses provided for them in the lock walls, these hand rails would interfere with the passing of the towing

are opened for the passage of a ship. The chains are raised and lowered by a method similar to that followed in hydraulic elevators, with the additional feature that if a ship approaches the gates at a dangerous speed and rams into the chain, the chain is paid out in such a way as to gradually stop the ship before it reaches the gates. Lowering the chain for the passage of a vessel and raising it again after the vessel has passed is accomplished by two motors; one driving the main pump supplying water under pressure, and the other operating a valve which controls the direction of movement of the chain. These two operations are combined in one, each motor being stopped automatically by a limit switch when the motor has performed its function.

The filling and emptying of the locks is accomplished by three culverts, one in the middle wall and one in each side wall, the flow of water being controlled by rising stem valves. They are located in culverts at points opposite each end of each lock so that the culvert can be shut off at any desired point for filling a lock with water from above, or upstream, or for emptying it by allowing it to flow out and down to the next lock. Lateral culverts conduct the water from the main culverts, under the lock chambers, and up through openings in the lock floors.

The rising stem valves are installed in pairs, and each pair is in duplicate; also each culvert is divided into two parallel halves at these valves by a vertical wall. This arrangement reduces the size of each valve

and makes it more easily operated, each valve being 8 by 18 feet. One pair of duplicates is left open as a guard, or reserve pair; the other pair is used for operating, so that in case of an obstruction in the culvert or accident to the machinery, the duplicate pair can be used.

At the upper ends of the culverts at the side walls, the duplication is accomplished by three valves in parallel, called the guard valves. They perform service exactly similar to the rising stem valves, except that three valves in parallel in this case must conform to the same laws as the two in parallel in the other case.



Mr. Edward Schildhauer, Electrical and Mechanical Engineer, Isthmian Canal Commission.

The culvert in the middle wall must serve the locks on both sides, and to control this feature cylindrical valves are placed in the lateral culverts that branch out on each side. There are ten of these on each side of the culvert at each lock.

At the upper end of each set of locks, there are two valves in the side wall for regulating the height of water between the upper gate and upper guard gate, as it is desired to maintain the level of the water between these gates at an elevation intermediate between that of the lake above and that of the upper lock when the upper lock is not at the same level as the lake. These valves are called the auxiliary culvert valves.

REASONS FOR USING THE CONTROL SYSTEM ADOPTED.

As the flight of locks at Gatun, for instance, extends over approximately 6,200 feet, and the principal operating machines are distributed over a distance of about 4,000 feet, it can be readily seen that central mechanical transmission of control of machines would be almost impossible; and to control the machines locally would mean a large operating force distributed practically along the full length of the locks, which has invariably been the practice heretofore. Such a force would be difficult to co-ordinate into an efficient operating system. The situation therefore resolved itself into centralized electrical control, which reduces the number of operators, operating expense, and liability to accident. To accomplish this system of control, a control board for each lock was constructed which permitted having all control switches located thereon mechanically interlocked so as to minimize, if not entirely prevent, the errors of human manipulations.

CENTRALIZED CONTROL AND INDICATING SYSTEM

The control boards are installed in control houses located on the middle walls at points which afford the best view of the locks, although this view is not depended on to know the position of the gates or other apparatus, as all are provided with indicators on the control board. The control boards are made approximately operating miniatures of the locks themselves, and are arranged with indicating devices which will always show the position of valves, lock gates, chains and water levels in the various lock chambers; and with the exception of such machinery as needs only an "open" or "closed" indication, the indications will be synchronous with the movement of the lock machinery.

For such indication, appliances with commutators, multiple contacts or ratchet mechanisms would not be suitable because of the many contacts and small pieces in their construction; and particularly because devices of this character move step by step and would not indicate all points in the movement of the main machinery, such indications being more or less approximate to the number of steps in the indicating devices. The indicators on the Panama control boards were developed especially for this undertaking, and show accurately and synchronously every movement of the machinery to which they are connected, whether in the extremes of travel or at any intermediate point.

A complete synchronous indicator consists of a transmitter located at and operated by the machine in the lock wall, and a receiver operating an indicator at the switchboard in the control house. Both transmitter and receiver have a stationary and a rotating part. The stators have three-phase windings with leads from three corresponding equidistant points brought out and connected together, but not connected to a source of power, the stator coils being energized by induction from the rotors. The rotors are bipolar and are connected in multiple and energized from a 110 volt 25 cycle single-phase source.

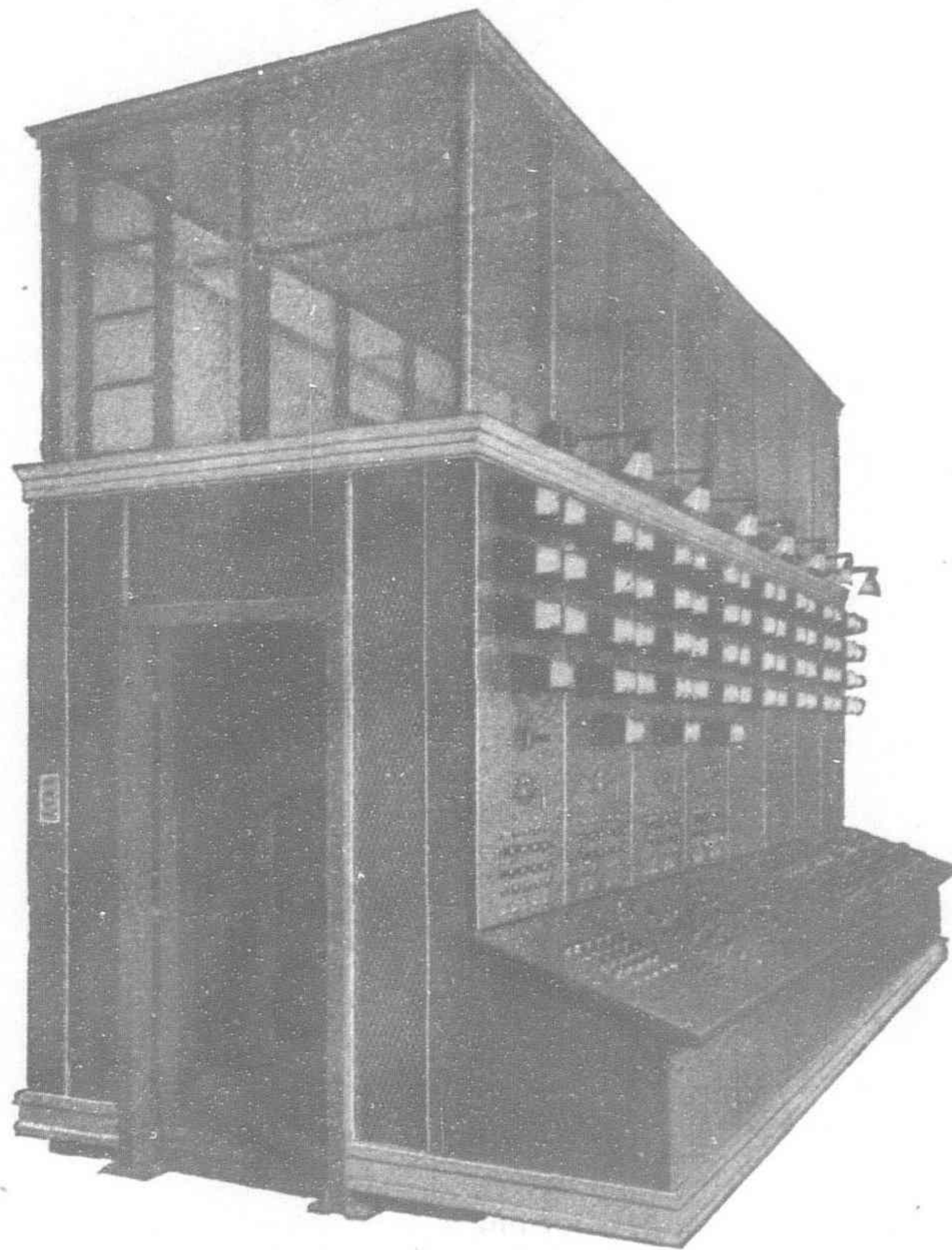
The movement of the lock machinery and with it the connected transmitter rotor produces a field in the transmitter stator polarized in the direction of the rotor axis, which induces voltage in the stator coils. This voltage is transmitted by the three-phase connection above mentioned to the receiver stator coils and duplicates in them but in the reverse direction, the same conditions of polarity and voltage as present in the transmitter. The rotor of the receiver being energized by the external source in the

same direction as that of the transmitter, is reacted upon by the polarized receiver stator until the magnetic axes coincide and the rotors of both transmitter and receiver are in the same relative position. Any difference in the position of the transmitter and receiver rotors causes a difference of potential between the stator windings with a consequent flow of current and resultant torque, which again moves the receiver rotor to the same relative position as that of the transmitter rotor. The receiver rotor follows closely and smoothly the movement of the transmitter rotor, and consequently imparts to the position indicator a movement identical with the movement of the lock machine, although on a scale reduced to the requirements of the control board. A brief description of the individual synchronous indicators follows.

In the case of the mitering gates, the vertical operating shaft is connected to a shaft which operates the transmitter machine. The latter shaft is threaded and carries a nut on which is mounted a rack. The rack engages a gear on the rotor shaft, and this turns the rotor as the gates operate. The mitering gate indicator comprises a pair of aluminum leaves, shaped to correspond to the plan view of the top of the gate, which travel horizontally just above the top of the board, the hinge ends being connected to shafts extending down through the surface of the board where they are geared to the receivers by means of bevel gears. When the miniature gates are completely opened, they are covered by shields to give the effect of the gates folding back into recesses in the lock walls.

For the chain fender, the position indicator transmitter is driven by the shaft which operates the limit switch that controls the stroke of the piston. The indication on the board is given by a small aluminum chain, which, like the large chain, is raised and lowered, each end operating independently, the large chain being lowered to the bottom of the lock and the small chain into a slot on the control board. The ends of the miniature chain are fastened to semaphore arms which are connected to segmental gears meshing with the driving gears on the receiver machines. As the receiver rotors turn, the chain is either lifted or lowered, the position of the large chain from the bottom of the lock being indicated by the angle of the semaphore arms.

As the rising stem valves occur in pairs, their position indicator machines occur in pairs also. The transmitter rotor is driven by a shaft and gearing similar to that described for the mitering gates. Each indicator is similar to a small elevator, a car being used to indicate the position of the valve gate. Both front and back of the shaft is fitted with opal glass marked with black lines for the $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ positions. A small aluminum cage moves up and down in each compartment. A drum for



2,200 Volt A. C. Instrument and Control Board for Gatun Hydroelectric Station.

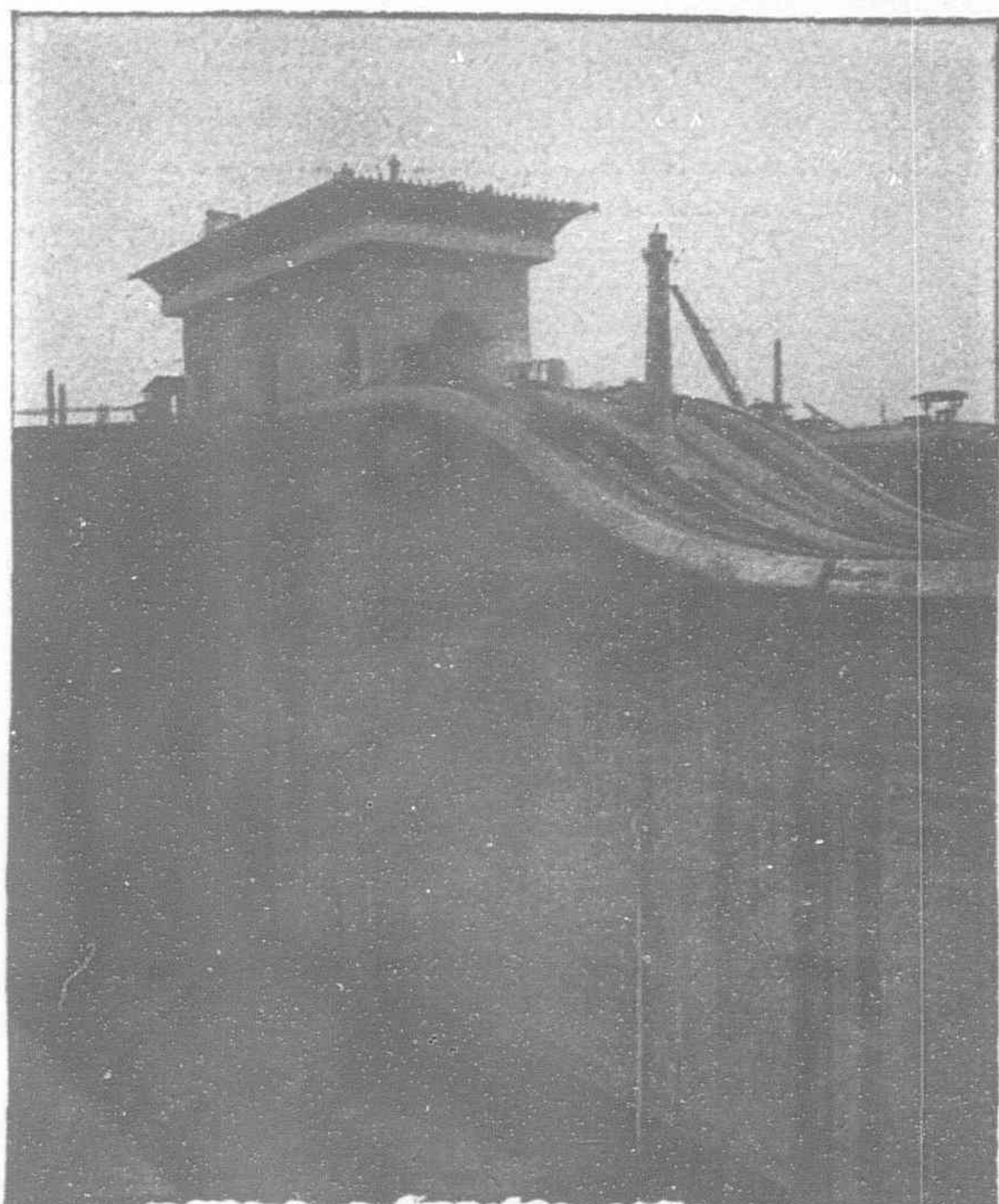
operating the cord which raises and lowers the cage is located underneath the control board and is operated by the receiver through a suitable train of gears. To make the indications visible from points up and down the control board, the elevator shaft under each car is always illuminated and the portion above is dark.

WATER LEVEL INDICATORS

The specifications covering the water level indication required an accuracy of $\frac{1}{20}$ of a foot or $\frac{1}{10}$ of 1 per cent. in actual water level. In the transmitters and receivers for the machines described previously, the

rotors turn less than 180 degrees with an inherent lag of $1\frac{1}{2}$ per cent. between transmitter and receiver rotors in this distance, which obviously prevents this arrangement from being employed to give the water level indication.

It was found that if the rotors were revolved ten complete revolutions, the required accuracy could be obtained: but since this arrangement makes it possible for the rotors to be in synchronism every 180 degrees, or in twenty different positions for the entire travel, the indicators would not indicate correctly if for some reason the transmitter rotors were turned more than $\frac{1}{2}$ revolution with the power off. Therefore, the required accuracy was obtained by two sets of transmitters and receivers, one set connected to a fine index in which the rotors make ten complete revolutions and the other set connected to a coarse index operating less than 180 degrees.



Control House at Gatun where Lock Control Board is Installed.

The fine index is a hollow cylinder carrying a pointer, the length of the cylinder being such that when an aluminum ball representing the coarse index, which can be depended upon for coarse indication, is within the limits of the cylinder, the reading of the fine index is correct within the limits specified. The scales are illuminated by lamps in both base and top caps of the indicator.

For water level indication, wells 36 inches square in the lock walls with communication to the lock by a small opening at the bottom of the well to dampen surges contain a welded steel box float, 30 inches square by 9 inches deep. A non-slipping phosphor bronze belt transmits the movement of the float to a sheave fitted with pins on the transmitter mechanism, the pins registering with holes punched in the belt. The sheave shaft is carried in ball bearings with oil cups for lubrication and drainage cocks at the bottom of the bearings.

The position of the miter forcing machine is not indicated by synchronous indicators, but its open and closed positions are shown by red and green lights and a mechanical indicator on the control board representing the machine.

CONTROL BOARDS REPRESENT LOCKS IN MINIATURE

The control boards are of the flat top benchboard type, 32 inches high by 54 inches wide, built in sections, with total lengths as follows:—

Gatun	64 feet
Pedro Miguel	36 "
Miraflores	52 "

The side and center walls of the locks are represented by cast iron plates and the water in the locks by blue Vermont marble slabs. The outer edge of the board is surrounded by a brass trim rail, and the sides are enclosed with steel plates which can be readily removed for inspection of the board. The control board is supported by a wrought iron framework resting on base castings, which are in turn supported on the operating floor of the control house.

The control switch handles are mounted above the surface of the board and operate through an angle of 90 degrees. They are provided with namplates for the "open," "closed" and "off" positions. The space immediately below the flat top of the control board is occupied by the contact fingers of the control switches, mounted on the operating shaft, synchronous receivers and their cable connections. Connection boards are provided for the cables, which are led up from each side, as are buses for supplying current to the control switches, receivers and the lamps that illuminate the scales of indicators. The receivers, transmitters and lamps

are operated at 110 volts, while the control circuits are 220 volts, both using 25 cycle alternating current.

MECHANICAL INTERLOCKING SYSTEM

In order to make it necessary for the operator to maneuver the control switch handles always in a certain order, corresponding to a predetermined sequence of operation of the lock machinery, and to prevent the operator in control of one channel from interfering with the machinery under the jurisdiction of the operator controlling the other channel, these control switches are provided with interlocks. The interlocks are in two vertical racks under each edge of the board and some distance below, so that they may be inspected and oiled from a floor which is about seven feet below the floor on which the switchboard operator stands. The latter floor does not extend across under the board, this space being open so that all parts on the underside of the board are accessible from the floor below.

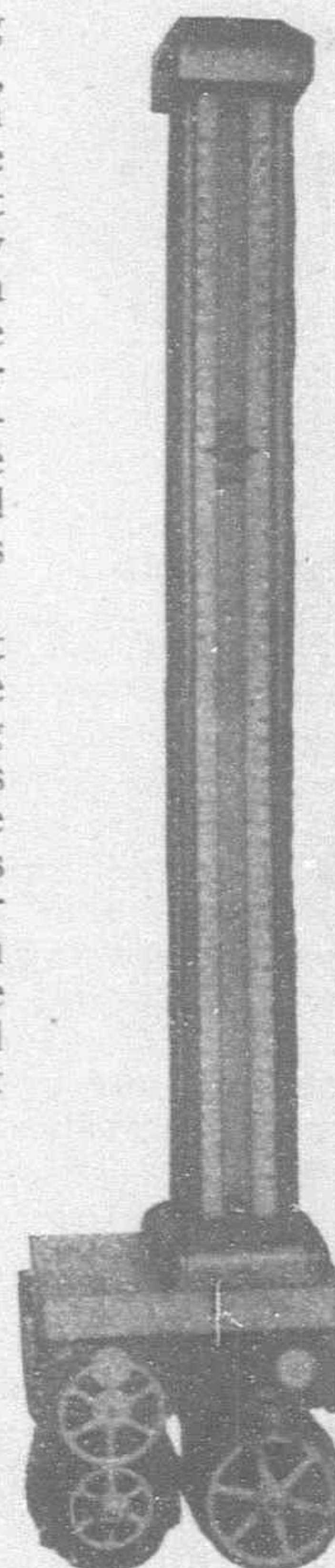
Vertical shafts operated by connecting rods from the control switch shafts extend downward past the electrical parts for the operation of the interlocks. The interlock system is essentially a bell crank mechanism, connecting the shaft of the control switch through a movable horizontal bar to a vertical operating shaft which can or can not move according to the relative positions of the interlocking bars and dogs. The interlocking rack is a steel frame carrying five horizontal members. Upon these and tying them together are vertical steel straps which carry brass runway posts for the vertical and horizontal interlock bars. These posts are riveted to the vertical steel straps, a thin brass plate between posts and straps making the runways non-corrosive. The vertical operating shafts are of square steel turned on the ends and work in brass bearings near top and bottom of the interlocking rack. Forked cranks mounted on the vertical operating shafts move the horizontal interlock bars by means of pivot blocks set over pin blocks riveted to the horizontal bar. The interlock bars and dogs are of special shape hard extruded brass, which section keeps the dogs in line with the axis of the bars when under pressure by being engaged with another dog on a vertical bar. Every control switch uses a horizontal bar of from 3 to 50 feet long.

The interlock system depends mainly on the action of engaging bevel dogs located on horizontal and vertical bars, the movement of a horizontal bar tending to lift a vertical bar by bevels on the dogs. A horizontal bar can not be moved without raising a vertical bar. Thus if at any time a dog on a horizontal bar rests against the upper end of a dog on a vertical bar, no movement of the horizontal bar where the dog engages with the vertical bar can take place, and the control handle connected to that particular horizontal bar is locked.

Interlocks prevent the chain fender from being lowered until adjacent mitring gates have been opened, and also prevent the gates being opened until the chain is in the raised position. In this way it is assured that the chain fender will always be in the up position to protect the gate when the gate is closed. To avoid unnecessary complication, each end of the chain is interlocked with the leaf on its side of the lock only, because as a rule both leaves of a gate, as well as both ends of a fender chain, will be opened simultaneously, and further interlocking is unnecessary. After the mitring gates are closed, a miter forcing machine is operated by a control handle and locks the ends of the gates closed. This machine cannot be operated until the gates are closed.

Also the rising stem valves of the side wall, next above or below a miter gate, must be closed while the miter forcing machine is open. As the miter forcing machine cannot be closed until the gates are closed, this means that the valves either above or below the gate must remain closed until the gate itself is closed, thus preventing the operator from creating a current of water around the gates while they are open, or being moved in opening or closing. This interlock is not included on the middle wall valves for the reason that they will be used with the locks on either side and must be free for that purpose.

Either pair of rising stem valves may be opened first, at the choice of the operator, an interlock becoming effective when the first valve of the second pair of duplicates is opened. This is done by a novel arrangement of equalizing levers acting against the ends of the interlock bars, with certain definite amount of lost motion which is taken up on opening the first pair of valves, thus putting the interlocks in operation on the next pair. To illustrate this operation, consider, for example, a side wall culvert at Gatun with its principal rising stem valves at each change of level from one lock to the next. The control of these valves is interlocked so that if the valves are opened at one particular point, the valves a lock length upstream or downstream cannot be opened. Thus the operator is limited to equalizing the water between locks and cannot allow water to flow from the upper lock past the middle lock into the lower lock, which operation, if permitted, might flood the lower lock walls and the machinery chambers in them. The cylindrical valves are interlocked so that if those on one side are opened the ones on the other side are locked closed, and the opening of one switch on a side will lock the opposite ten. This prevents careless cross filling between locks, which operation might be combined with the regular method and produce flooding. However, there may be times when it is desirable to employ cross filling to economize in the use of water from Lake Gatun in the dry season. For this reason this interlock is made removable by the



Water Level Indicator

use of a Yale lock and key. The key will be placed in the hands of the chief operator.

In the use of the middle wall culvert, the cylindrical valves on one side or the other must be opened before the rising stem valves can be opened, and the rising stem valves must be closed first. This interlock is applied in order to require the operator to control the flow of water by means of the rising stem valves rather than by the cylindrical valves.

In most cases the locks are divided into two unequal parts by the intermediate mitring gates. This arrangement makes it necessary to divide the ten cylindrical valves into two groups of seven and three, respectively, for the long and short lengths. A selecting lever is provided for these interlocks and may be set as indicated by a nameplate on the lever to "three," "seven" or "ten" respectively; whereupon the corresponding valves are subject to that interlock, and the others of the group of ten are locked closed if three or seven only are to be used. The failure of the operator to make his selection properly in advance will simply cause him the trouble of going back and doing so, as the remaining valves are locked closed. This arrangement permits handling small vessels without causing waste of water due to operating such vessels in the large chambers. If a short vessel were being passed downstream, it would first pass into the chamber having three cylindrical valves. The group selective lever would then be placed on the "three" position which would permit the opening of three valves above the intermediate gate, but would lock closed the other seven valves above it. After the vessel had been passed below the gate the handle may be reversed releasing the lever, and locking three switches.

There are intermediate rising stem valves in the side walls at each intermediate gate, but no interlocks are applied to these for the reason that they will be used in a more or less irregular manner, and no fixed laws for their operation can be made in advance. Moreover, they control the water only between different sections of the same lock, and there is not the danger from mistakes in operation which exists in the case of the other valves which control water between lock levels. The same is true of the small auxiliary culvert valves, by means of which the space between the upper guard gate and upper main gate is filled and emptied.

In case a large vessel is to be locked through, the interlocks on the intermediate gates can be made ineffective by the operation of a Yale lock which uncouples a clutch and disconnects the central switch from the operating mechanism. Turning the key removes the interlock and permits the intermediate gates to be thrown open to obtain a 1,000-foot level and the valves operated independently of these gates.

To obviate the possibility of flooding the locks when valves are in a certain position, diagonal interlocking is introduced between the rising stem valves of the side wall and those of the middle wall a lock length away. This interlocking between valves diagonally across a lock when the cylindrical valves are open is needed to prevent the flow of water from, say, the upper lock by way of a side wall culvert to the middle lock, thence by way of the middle wall culvert to the lower lock, thus allowing an operator through carelessness to flood the lower lock walls. If the cylindrical valves of a certain lock are closed, the interlock is not needed on the rising stem valves of that lock; and since such interlock would interfere with the proper use of the valves of its twin lock on the other side of the middle wall, this interlock is automatically removed when all ten cylindrical valves are closed on the particular lock in question, and is automatically applied again if one or more of the ten cylindrical valves are opened. Furthermore, the valves of the side wall immediately at the gate which is being

moved will be open to equalize water level, and diagonal interlocking will prevent the opening of the middle wall valves a lock length above or below the gate being moved. Each of the four valves of such a group has independent control, their control switches being so interlocked that either pair may be opened and left open as guard valves, the interlocks becoming effective when the operator tries to open the first valve of the second pair. In addition to these pairs of valves in parallel, each pair is duplicated at each change of level from one lock to the next.

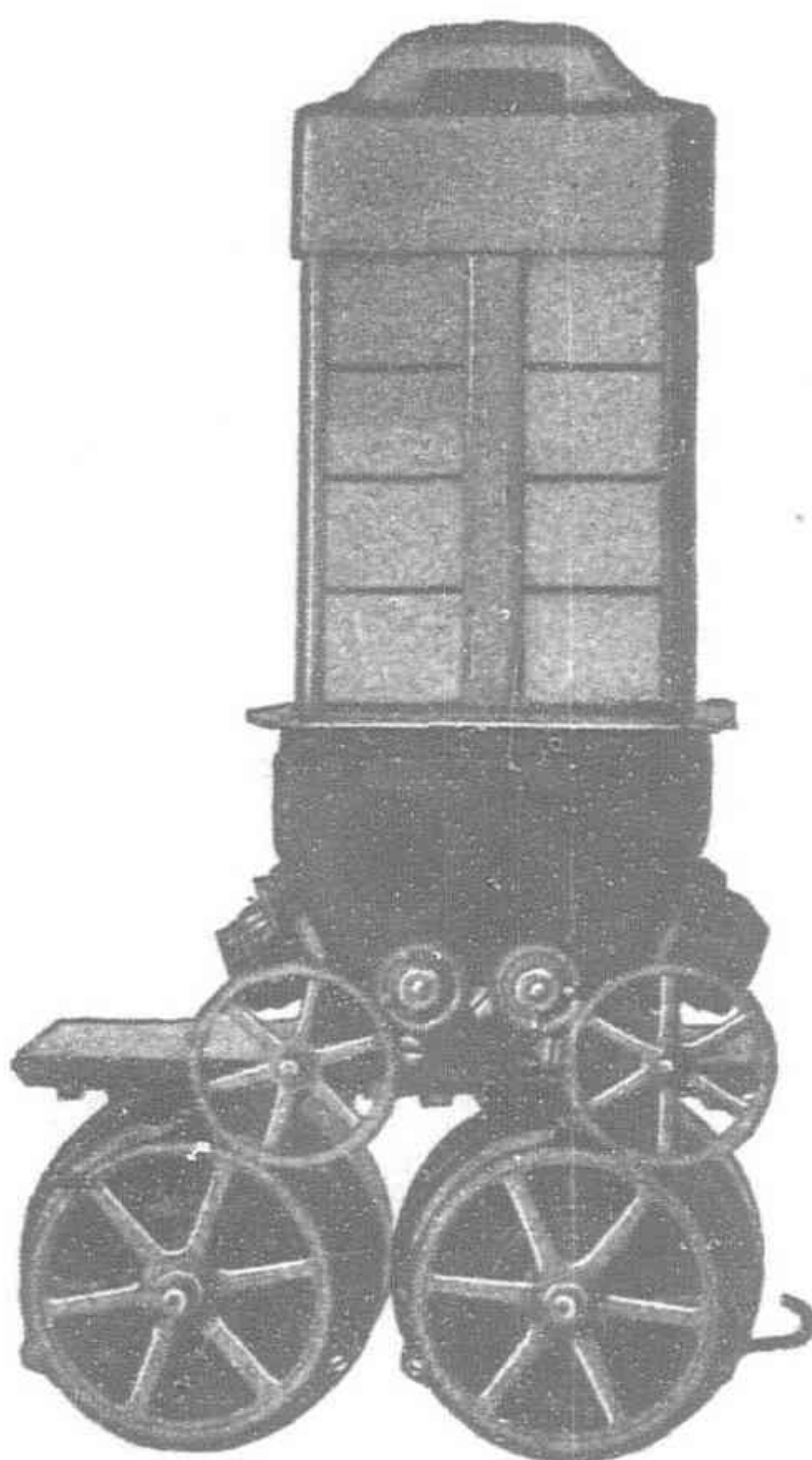
SPECIAL CLIMATIC REQUIREMENTS

To withstand the humid atmosphere of the Isthmus, every insulated part, such as solenoid, relay, circuit breaker and other coils, was impregnated with non-hygroscopic compounds. All small parts were made either of brass, copper, Monel metal, bronze, or of sherardized iron or steel. Mica and treated asbestos lumber were used largely in place of fibre or wood.

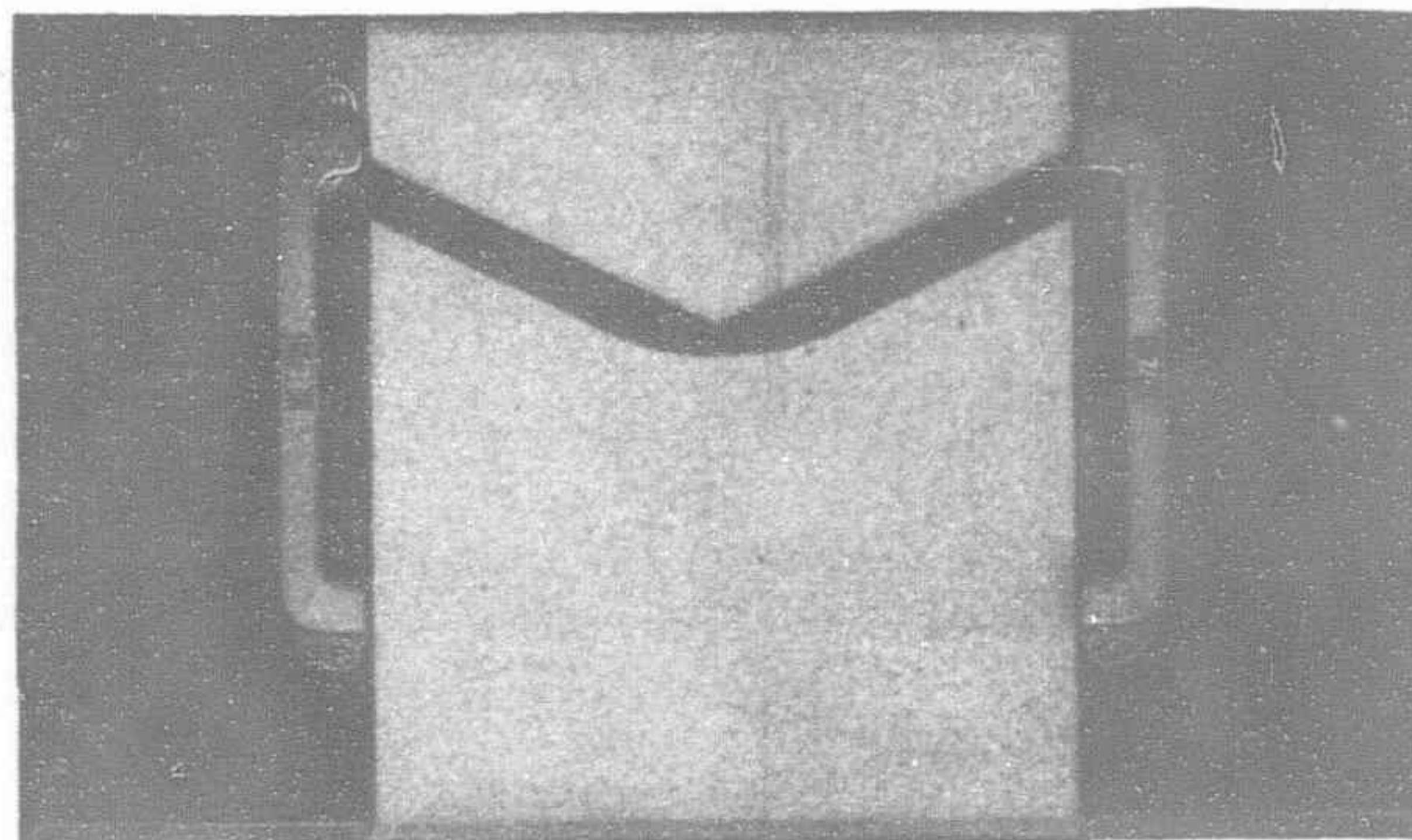
INTERESTING MANUFACTURING DETAILS

Nearly two thousand special drawings were required in the fabrication, and there were also involved the following unusual quantities of materials.

Special slate bases.....	1,300
Small castings	160,000
Screw machine parts	1,200,000
Copper rod and bar	58,000 ft.
Asbestos lumber	9,000 sq. ft.
New patterns	650
New jigs, templates, tools, etc.....	625
Porcelain parts	18,000
Special bus supports.....	6,800
Gal. pipe (framework).....	21,000 ft.
Special gears	2,300
Special instruments	640
Miscellaneous sherardized pieces	300,000
Cases for boxing	4,150



Rising Stem Valve Indicator



Mitering Gate Indicator.

The combined weight of the centralized control boards for Gatun, Pedro Miguel and Miraflores is about 39 tons. In their construction there is employed.

More than 2½ miles of interlocking rod;

About six million feet of control leads—made up in 5 and 8 conductor cables.

732 indicator motors.

464 control switches.

All of the lock machinery motors, control panels, centralized control boards, power station generating apparatus, switchboards, transmission line substation equipments, coaling stations, and practically the entire electrical equipments, for the wharf terminal cranes and for the extensive permanent repair machine shops were manufactured by the General Electric Company.

WATER PURIFICATION

Messrs. Mather & Platt, Ltd. of Manchester have recently completed three extensive schemes of Water Supply and Filtration and they have in hand several other contracts of a similar nature.

Towards the end of 1912 they completed a scheme of Water Supply and Filtration at Loxley Valley for the Sheffield Corporation. It consisted of 32 filters, each 8 feet diameter, fitted with the improved washing apparatus which is one of the special devices of the mechanical filters manufactured by Messrs. Mather & Platt. The agitating gear of the washing apparatus is driven by line shafting operated from a horizontal oil engine. This installation has been working regularly during the past year and supplies the town with about 7,000,000 gallons of pure water per day. The Sheffield Corporation have since instructed Messrs. Mather & Platt to proceed with a further installation of 24-8 feet filters with coagulating apparatus for the addition of lime and alumina ferric similar to those already installed.

Another recent completion was an extension of the Water Supply and Filtration Plant for the Rhymney & Aber Valleys Gas & Water Co. The original installation consisted of 10-8 feet filters. The present extension comprises a further six similar filters. The whole 16 filters are now in regular use and are giving most satisfactory results.

Last year Messrs. Mather & Platt completed an installation of four of their mechanical filters for the Fraserburgh Corporation, and have recently erected an additional two filters of the same size, viz., 8 feet diameter: the six filters deal with a daily supply of about three-quarters of a million gallons. An installation of six patent mechanical filters is on the point of completion at the Brindley Bank Pumping Station of the South Staffordshire Water Co.

Other recent contracts included two 8 feet filters for the Rhymney & Aber Valleys Gas & Water Co., two for the Newquay and District Water Board, two for Salford Corporation Electricity Works, eighteen 9 feet filters for the Oldham Corporation, one for Accrington Electricity Works, one 6 feet filter for the Paisley Corporation and two 8 feet filters for Llandrindod Wells.

In addition the firm has in hand several contracts for abroad including 6 filters for India and 3 for South Africa.

Messrs. Mather & Platt point out that they are in a position of advantage in the carrying out of schemes of Water Filtration and Purification inasmuch as although there are many firms who manufacture Filters, Water Softeners and Sewage Plant singly they are the only firm who manufacture appliances for the whole three sections. They are consequently familiar with all the details necessary for the effective carrying out of either Municipal Water Purification work or the installation of an industrial Filtration scheme.

CONSTRUCTION OF RAILWAYS IN CHINA

The Ministry of Communications has addressed the following petition to the President requesting that no loans should be contracted for the construction of new railways which have not yet been proposed or started:—

For want of means of communication much inconvenience has been felt for the progress of administration and the economic condition of the country. Those who are anxious about the situation of the country have unanimously advocated that the only means of salvation lies in the construction of more railways. Since the inauguration of the Republic the idea of inviting foreign capital for the development of railways has become deeply rooted in the mind of the public. Therefore for the past two years this Ministry has, according to the internal and external conditions of the country, drawn up plans for the construction of all the important lines, as reported from time to time, and it has been estimated that the mileage of these proposed lines is tens of times longer than before. Consequently there are thousand and one difficulties to be solved. The railways which have already been constructed have to be properly managed. The railways the ownership of which has been transferred to the Government, have to be settled. Those which are under construction should be continued properly. Those the concessions of which have been given out, should be built according to the time limit. Men should be trained immediately to manage these lines, and diplomatic intercourse should be attended to with care. The interest and principal of foreign loans should be met in due course.

Hitherto we have contracted foreign loans for the construction of railways, but on account of the lines being unskillfully chosen or want of forethought, the Government has to put in tens of millions of dollars to assist in the enterprise. Moreover for want of centralization of finances this Ministry has to shoulder the whole responsibility. Therefore the whole year round this Ministry has to attend to the means of financing the railways, and consequently there has been no time left to attend to the other immediate affairs. Hence many complaints have been received. If in former days more attention had been given to the railway affairs, better plans made and the redemption of loans carefully planned there would not be so many difficulties besetting us to-day. However the past serves a good warning. No hasty steps should now be taken to injure the general situation and to sow difficulty for the future. Therefore in every step we now take it should be done with utmost care. Although there is no comparison between the mileage of railways of this country and that of the other countries in Europe or America, it must be borne in mind that the development of railways must be in proportion to the development of industry, the politics and the economical condition of the country. Moreover there must be a general plan for all the lines of the country. Hence this Ministry is now being engaged in the work of making the general plans, and at the same time we have been collecting the ideas of experts of this country. Hereafter it is desirable that no blunder should be made. Therefore it is hereby requested that a policy for the construction of the railways should be definitely fixed. Henceforth, regarding the contracting of loans for the construction of railways, with the exception of the concessions the contracts of which have been signed, or the lines have already been proposed all the other railways projects should be stopped.

The President approved the proposal and instructed the Ministry to enforce the same.

ELECTRICAL ENTERPRISE IN KOREA

Up to the end of last year official permission was granted to 18 companies desirous of undertaking electric enterprises in Korea. The aggregate capital of these companies amounted to 11,880,000 *yen* and the total capacity of the plants to be possessed by them for generating electricity was 8,100 kilowatts. Fifteen companies with a capital of 11,730,000 *yen* were actually

engaged in business with a paid-up capital of 6,497,840 *yen* between them. The number of householders receiving the supply of electricity was 11,058, the lamps installed in these houses numbering 77,880 in all.

This year, permission has been granted to the electric company at Suwon, which has a subscribed capital of 60,000 *yen*, of which 21,000 *yen* has already been paid in. The machinery of the company is able to generate 40 kilowatts of electricity. At present the company supplies electricity to about 300 households. Two more electric companies, one at New Wiju and the other at Hamheung, are now engaged in construction work.

HUPEH CEMENT WORKS

A Peking correspondent states that he is reliably informed that the trouble between the French Banque Industrielle and the Hupeh Cement Works has been settled by the assistance of the Cheehsin Cement Company of Tangshan which, with the permission of the Chinese Government, has lent the sum of Tls. 1,400,000 to the Hupeh Cement Works for the payment of the French loan and its Japanese creditors. Thus the Hupeh Cement Works, of which Mr. Cheng Chu-fu will probably remain Director, will be administered by the Cheehsin Cement Company. In view of the success of the Tangshan Cement Works during the last few years, it is believed that there is a good future before the Hupeh Works.

The Chinese Cement Works at Canton has petitioned the Ministry of Commerce requesting that the Provincial authorities of Kuangtung should be instructed to protect the works and not allow foreigners to buy shares or interfere in any way with the enterprise.

In the course of a recent lecture on "Electric Traction," given in the large hall of London Bridge Station, Mr. P. Dawson, consulting electrical engineer to the London, Brighton and South Coast Railway, said that so far as the electrification of main line railways was concerned, equal progress had been made in Europe and in America. About 2,000 miles of single track had been electrified in each case. He regarded as the most important electrification scheme so far carried out that of the New York, New Haven, and Hartford Railway.

A rope railway, 75 miles in length, is to be put into operation in India. It will connect the rich country in the vale of Kashmir with the plains of the Punjab over the Himalayas. The line, it is claimed will be the longest in the world, the present longest being 22 miles and situated in Argentina. Sections will be 5 miles long, and most of the spans will be 2,400ft. The steel towers, some of which will be 100ft. high, will be braced, and double 1½ in. cables, 9ft. apart, will carry the steel cars. The carrying capacity of these cars will be about 400 lb.

The Seishin-Kwainai Railway, 60 miles in length, is to be constructed in the course of five years from the present fiscal year. A tendency has been observed these few years for a gradual increase in the imports to North Manchuria via the port of Seishin on the northeastern coast of Chosen. The markets of Japanese imports to Chientao and Hunchun are expanding. As the railway construction work progresses inland, the completed section will be utilized to quicken this tendency, and, when the whole line is finished, the trade system of the eastern part of Kirin Province on the Korean frontier will be revolutionized. Y. 200,000 is set apart chiefly for preparatory work.

During last March, the Electricity Works, Changchun, supplied 60,244 kilowatts of electricity for 11,650 lamps in addition to 122,152 kilowatts for motor power. The total earnings for that month amounted to Y. 10,241, as against Y. 5,478 for the corresponding month of last year. The demand for power use nearly doubled in the course of a year.

FAR EASTERN RAILWAYS

CHINA

The Chekiang Railway.—It is reported that a satisfactory arrangement for the handing over of the Chekiang Railway to the Government has been arrived at. The price to be paid to the shareholders of the company has not been officially stated, but is said to be \$17,000,000.

Kirin-Changchun Railway.—The traffic receipts of the Kirin-Changchun Railway for March decreased to S. Y. 67,788. The two terminal stations at Toutaakon (the junction between the S. M. and the K.-C. lines) and Kirin contributed the largest shares, giving S. Y. 26,651 and S. Y. 24,738 respectively. The Changchun Station followed with S. Y. 5,307. The receipts of the other stations were less than S. Y. 2,000.

Pukow-Singyang Line.—It was the original intention to start construction of this line from Wu-i and Singyang simultaneously, but owing to the disturbed conditions in Honan this could not be done. The Director General, Mr. Shen Yun-pei has now given instructions that work should be started on the Singyang section as soon as possible.

Shanghai Nanking-Railway.—The following figures of traffic returns (approximately) for the week ended March 14 are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods & Sundries.	Total for the week.
	\$	\$	\$
1914....	46,642	11,250	57,892
1913....	52,337	11,962	64,299
Increase.	—	—	—
Decrease	5,695	712	6,407

For thirty-seven weeks.

Year.	Passengers.	Goods & Sundries.	Total
	\$	\$	\$
1914....	1,754,463	364,222	2,118,685
1913....	1,555,812	340,804	1,896,652
Increase.	198,651	23,382	222,033
Decrease	—	—	—

Week ended March 21.

Year.	Passengers.	Goods & Sundries.	Total
	\$	\$	\$
1914....	54,688	12,610	67,298
1913....	50,512	11,430	61,942
Increase.	4,176	1,180	5,356
Decrease	—	—	—

For thirty-eight weeks.

Year.	Passengers.	Goods & Sundries.	Total.
	\$	\$	\$
1914....	1,809,151	376,832	2,185,983
1913....	1,606,324	352,270	1,958,594
Increase	202,827	24,562	227,489
Decrease	—	—	—

Week ended March 28.

Year.	Passengers.	Goods & Sundries.	Total
	\$	\$	\$
1914....	51,383	11,348	62,731
1913....	53,252	10,351	63,603
Increase.	—	997	—
Decrease	1,869	—	872

For thirty-nine weeks.

Year.	Passengers.	Goods & Sundries.	Total
	\$	\$	\$
1914....	1,860,534	388,180	2,248,714
1913....	1,659,576	362,621	2,022,197
Increase.	200,958	25,559	226,517
Decrease	—	—	—

Week ended April 4.

Year.	Passengers.	Goods & Sundries.	Total for the week.
	\$	\$	\$
1914....	49,865	12,141	62,006
1913....	49,069	9,431	58,500
Increase.	796	2,710	3,506
Decrease	—	—	—

For forty weeks.

Year.	Passengers.	Goods & Sundries.	Total.
	\$	\$	\$
1914....	1,910,399	400,321	2,310,720
1913....	1,708,645	372,052	2,080,697
Increase.	201,754	28,269	230,023
Decrease	—	—	—

Week ended April 11.

Year.	Passengers.	Goods & Sundries.	Total for the week.
	\$	\$	\$
1914....	60,434	12,790	73,233
1913....	48,998	10,996	59,994
Increase.	11,436	1,803	13,239
Decrease	—	—	—

For forty-one weeks.

Year.	Passengers.	Goods & Sundries.	Total
	\$	\$	\$
1914....	1,970,833	413,120	2,383,953
1913....	1,757,643	383,048	2,140,691
Increase.	213,190	30,072	243,262
Decrease	—	—	—

GENERAL

The Amur Railway.—The following information is from the report by H. M. Consul at Vladivostok, Mr. R. M. Hodgson, on the trade of that district in 1912:—

The Amur Railway, which is to connect, by means of a line entirely in Russian territory, the Siberian railway system with Khabarovsk and thence, by the already existing Ussuri Railway, with Vladivostok, has been progressing with unexpected rapidity. The distances on this line are as follows:—

	Versts.
Head section, from Kwenga to Urum ..	182
Western section, from Urum to Kerak..	596
Middle section, from Kerak to River Dyia	633
Eastern section, from River Dyia to Khabarovsk	480
Branch from Botchkaryoyo to Blagovestchensk	100
Short branch lines run to—	
Tchasovinskaya	28
Reynovo	63
Tchernayevo	40

Traffic on the head section has been open since 1910 and the western section was opened in the autumn of 1913. The whole of the middle section will be handed over for working in the autumn of 1914. Work on the eastern section is being pushed forward rapidly, and it is now likely that the whole line will be in use for local traffic by the end of 1914. The completion of the railway will, however, be impossible before the bridge over the Amur at Khabarovsk is finished, and this—an engineering work of real magnitude, for the bridge is to be 7,038 feet in length—cannot, at the earliest, be before the autumn of 1915. It is intended ultimately to divide the whole line into two parts, the eastern part to be known as the Amur Railway and to have its headquarters at Alekseyevsk on the Zeya River, and the western part, known as the Ussuri Railway, having its headquarters at Khabarovsk.

Russia is thus within measurable distance of executing, well within the projected time, the very formidable undertaking of constructing a railway 1,248 miles in length through country much of which was previously untrodden, and nearly all was uninhabited. Natural obstacles in the form of swamps and mountain ranges are met with all along the line except in the Zeya-Bureya district; the climate is extremely rigorous, and large tracts lie within the zone of perpetually frozen ground; moreover, it has been necessary to bring the whole working staff from great distances, mostly from European Russia. Under these conditions it is not surprising that the difficulties to be overcome were underestimated at the beginning, and that the expenditure has exceeded the original appropriations by some 40,000,000 roubles (about £4,222,000) or 20 per cent.

On the Ussuri Railway, important works are to be carried out, and 29,297,000 roubles (about £3,092,000) have been allotted for the purpose. The line is to be doubled throughout and between Kiparisovka and Nadyedjinskaya, near Nikolsk, the permanent way is to be changed and a tunnel 2,450 feet in length cut. The branch line to Shkotovo is to be improved. The building of wharves for coal, timber and fish on the southern side of Golden Horn Bay renders a connexion with the railway system indispensable. A branch line, 14.37 versts in length, is to be constructed for this purpose from Pervaya Ryetchka—the first station out of Vladivostok on the Ussuri line—at a cost of 3,956,630 roubles (about £417,000). It will go round the Eastern extremity of the bay and will pass through a tunnel 4,200 feet long.

A further project now being investigated is the building of a railway line from Shmakovka on the Ussuri Railway near Lake Hanka to the coast at St. Olga, or from Khabarovsk to Imperial Harbour. The Ministry of Ways of Communication is at present studying the relative advantages of the two routes. Some connexion by rail with the coast of the Maritime Province is obviously necessary.

The land connexion with Europe is by the Siberian Railway, there being two express trains every week to and from Moscow, and one to and from St. Petersburg. The journey by these trains to London takes 12½ days. A very considerable economy can now be effected by leaving the Trans-Siberian express and utilizing the daily express which has lately started running between Irkutsk and Moscow; this train does the journey in the same time and has a restaurant car and similar accommodation to the Trans-Siberian express.

Russian Railway Concession.—The Russian Far Eastern Press reports the acquisition of two valuable railway concessions by Russian subjects. One is for the construction of a railway from the station Manchuria, at the junction of the Chinese Eastern and Trans-Baikal lines, to Urga, which has been given to Mr. Badmaev, one of the pioneers of the trading firm of that name in the Trans-Baikal, which region was thickly sprinkled with branch houses during the building of the Trans-Baikal Railway. The second concession is for a line from Manchuria station to Nerchinsk Zavod and Sreysensk, granted to the former Minister of Commerce and Industry, Mr. Fedorov. This variant will proceed from the station Manchuria along the banks of the Argun to the station Olocha and beyond by the Olocha valley to Nerchinsk Zavod, and thence to Sreysensk on the Shilka. If these projects should be realized, Manchuria station will be an important junction on the borders of three states—Russia, China, and Mongolia. The Vladivostok correspondent of the "Japan Chronicle" says it is understood that Mr. Denisov, member of the Imperial Council and

President of the Board of Trade, has been largely instrumental in getting these deals pushed through, albeit in some quarters doubts are expressed as to the likelihood of there being money available in the present disturbed political condition of Mongolia. Be this as it may, Mt. Denisov appears to have satisfied himself on the spot, and to be engaged now in convincing others at St. Petersburg that for Russia the development of a widespread network of railways in the Far East is indispensable.

MANCHURIA

South Manchuria Railway.—The net profit for the current fiscal year ending the 31st inst. was estimated to be about Y. 5,000,000. The traffic earnings, up to last February totalled Y. 20,197,000, as against the aggregate of Y. 19,000,000 for the preceding fiscal year. A similar increase has been noticed in the other enterprises, such as mining, harbor, electricity, gas, shipping, etc. The net profit for the last fiscal year was Y. 4,920,000, the gross profit and gross loss amounting to Y. 33,540,000 and Y. 28,620,000 respectively.

The traffic returns for the month of March were Y. 2,010,298, being a decrease of Y. 548,218 compared to the corresponding month of last year. The decrease was owing to scarcity of Bean stocks due to the poor crops. The aggregate receipts for the fiscal year just closed reached Y. 22,237,833, being an increase by Y. 2,330,377 on the earnings of the preceding fiscal year.

Chinese Eastern Railway.—The Chinese Eastern Railway has lowered the freight rates on coal from Uolinaya which is the junction station to Sucheng Colliery, and Ippolitoffka which also connects with a small coal mine, to the other stations in North Manchuria. The comparative figures to Manchouli and Harbin are as follow:—

From	To Manchouli per pud	To Harbin per pud
Uolinaya	old rate 21.10 new „ 13.10	9.50 5.88
Ippolitoffka ..	old rate 19.70 new „ 12.17	8.10 4.92

The management evidently hopes to supply coal as a cheaper substitute for firewood, which rose to 34 roubles per cube from about 20 roubles of a few years ago and appears settled about 27 roubles. Even Fushun Coal, which is sold at about 12 roubles per ton, is still cheaper by three or four roubles, if two tons of coal is computed to be equal to a cube of firewood calorific power in calorific power.

CHOSEN (KOREA)

Taiden-Mokpo Line.—Celebrations were held at Mokpo on March 22 in connection with the completion of the railway from Taiden, a town in central Korea on the Seoul-Fusan railway, to Mokpo on the South-west coast. The construction of the Taiden-Mokpo line or Honan Railway, as passed by the 26th session of the Imperial Diet, was planned to be carried out in 11 years beginning from the fiscal year 1910, but thanks to the influence of the present Governor-General, Count Terauchi who recognized the importance of transport facilities in Chosen, the original plan was modified and the time of construction reduced to five years instead.

The line starts from Taiden, a station on the Seoul Fusan Railway, and reaches to Mokpo 161 miles with 14.8 miles branching from Riri out to Kunsan. The surveying was begun in May, 1910, and the civil engineering work in October. Up to the end of the fiscal

year 1911-1912, 69 miles—38 miles of the Taiden-Rokei section, 17 miles of the Kokei-Riri Section and 1.48 miles of the Riri-Kunsan Branch—were constructed and opened to traffic. Great engineering difficulties had to be overcome on the section passing through the beautiful and grand Noryong Mountain Range, situated between Seiyu and Chojyo Stations, for several large tunnels, one more than 3,000 feet in length had to be driven through hard rocks. Nevertheless the whole line could be opened at the beginning of January last to public traffic, much sooner than was expected.

TRAMWAYS

Shanghai Tramways.—The returns of the Shanghai Tramways (Foreign Settlement) for the week ended March 18, 1914, are as under:—

	1914. \$	1913. \$
Effective receipts (after deducting loss by depreciation of subsidiary coinage) ..	18,412.31	14,957.16
Passengers carried ..	988,636	757,692
Car miles run ..	59,893	48,790

The loss by depreciation of subsidiary coinage for the week was \$5,499.09 equal to 24.35 per cent. of the gross cash collected on the cars as compared with \$4,228.13, equal to 23.49 per cent. for the corresponding week last year.

Week end March 25.

	1914. \$	1913. \$
Effective receipts (after deducting loss by depreciation of subsidiary coinage) ..	18,080.99	15,623.23
Passengers carried ..	966,908	792,783
Car miles run ..	61,044	49,274

The loss by depreciation of subsidiary coinage for the week was \$5,393.88 equal to 24.36 per cent. of the gross cash collected on the cars as compared with \$4,467.13 equal to 23.61 per cent. for the corresponding week last year.

Week ended April 1.

	1914. \$	1913. \$
Effective receipts (after deducting loss by depreciation of subsidiary coinage) ..	18,595.03	15,470.40
Passengers carried ..	992,098	782,940
Car miles run ..	60,865	49,375

The loss by depreciation of subsidiary coinage for the week was \$5,562.53 equal to 24.46 per cent. of the gross cash collected on the cars as compared with \$4,411.38 equal to 23.60 per cent. for the corresponding week last year.

The following is the traffic return for the month of March, 1914, and for three months ended March 31, 1914, with figures for the corresponding periods last year;—

	Mar. 1914. \$	Mar. 1913. \$
Effective receipts ..	81,216.62	69,167.94
Passengers carried ..	4,342,343	3,499,970
Car miles run ..	265,948	221,018
Loss by depreciation of subsidiary coinage ..	24,269.49	19,639.47
Percentage of loss by depreciation of subsidiary coinage ..	24.38	23.50
Three months ended Mar. 31, 1914		Three months ended Mar. 31, 1913.
Effective receipts ..	237,638.63	201,794.00
Passengers carried ..	12,440,793	9,992,856
Car miles run ..	762,890	648,747
Loss by depreciation of subsidiary coinage ..	68,380.59	53,464.22
Percentage of loss by depreciation of subsidiary coinage ..	23.64	22.31

Week ended April 8,

	1914. \$	1913. \$
Effective receipts (after deducting loss by depreciation of subsidiary coinage) ..	18,968.36	16,498.28
Passengers carried ..	1,012,456	825,361
Car miles run ..	61,654	49,840

The loss by depreciation of subsidiary coinage for the week was \$5,724.28 equal to 24.50 per cent. of the gross cash collected on the cars as compared with \$4,635.67 equal to 23.24 per cent. for the corresponding week last year.

Week ended April 15.

	1914. \$	1913. \$
Effective receipts (after deducting loss by depreciation of subsidiary coinage) ..	20,621.51	17,203.86
Passengers carried ..	1,093,636	847,762
Car miles run ..	63,424	51,766

The loss by depreciation of subsidiary coinage for the week was \$6,255.49 equal to 24.48 per cent. of the gross cash collected on the cars compared with \$4,856.64 equal to 23.28 per cent. for the corresponding week last year.

Kyushu Electric Tramway Co (Japan).—

It is reported that the Kyushu Electric Tramway Company has decided to double the capital of the company, which then will be 6,300,000 yen.

The new shares representing the augmented capital will be issued to the original shareholders at the rate of one to every one old share.

SHIPBUILDING

Hongkong and Whampoa Dock Co.—An important shipbuilding contract has just been signed under which the Hongkong and Whampoa Dock Company are to build for the Nord Deutscher Lloyd a first class steamer for the China coast trade, says the *Hongkong Telegraph*. The steamer which is to be built to the rules of the Germanischer Lloyd has the following dimensions:

Length overall ..	259 ft.
Breadth ..	38 ft.
Depth ..	17 ft.
Speed ..	12 knots

The accommodation for the first and second-class will be of quite an up-to-date nature and will follow the lines set out in the mail steamers of the Company. In the dining room the old system of the one long table will be done away with and the new restaurant fashion with small tables, seating four at a time, will be installed. Large windows with patent brass frames will be a feature of the dining saloon, with double doors and all the latest methods of ensuring a cool breeze. The state rooms have been designed with the idea of securing the greatest possible space in each compartment, fitted throughout with electric light and fans which may be controlled from the berths or the settee.

The second class cabins will be situated aft and will follow the lines of the first-class, while the third-class and deck passengers will be carried on the top deck.

Cooking for the various classes of passengers will be carried out in European, Chinese, and Malay galleys.

The vessel being primarily a mail carrier, dead weight has given place to draught and in consequence of this the cargo carried will not exceed one thousand tons, to deal with which powerful steam winches and a twenty ton derrick will be installed. The latter is to deal with the heavy machinery that is now being imported into China and Malaya.

The machinery will consist of two sets of 2,000 H. P. I. triple expansion engines with cylinders H. P. 17in. E. P. 17in. L. P. 44x30in. stroke. Three single-ended boilers will supply 190 lbs. steam pressure. The shafting will be protected throughout, the shell plating being carried to the cast steel propeller brackets.

The anchors, and cables, will be complete to meet the emergencies of typhoons and rough weather a steam windlass with a capstan on the fore-castle head being installed for quick warping. A complete electric light plant, fed by two dynamos, will provide illumination for the cabins and saloons, and for handling cargo at night.

The Dock Company have already constructed six steamers for the N. D. L. as well as other craft, but this is the largest order that the latter has placed with the Company. Work, which will be carried on under the supervision of the acting Supt. Engineer, Mr. Nielsen, has already been commenced, the keel having been laid.

Shanghai Dock and Engineering Co., Ltd.—On March 28, the steel, twin-screw steamer *Tung Wo* was successfully launched from the Footung Yard of the Shanghai Dock and Engineering Co., Ltd. The vessel was built for carrying passengers and cargo on the Upper Yangtze, measures 242 feet and 6 inches long, 40 feet moulded breadth, and 10 feet moulded depth. European and Chinese saloons and the usual stateroom accommodation for 12 Europeans and 20 Chinese, having all the latest furniture and fittings, are fitted on the saloon deck. On the main deck is accommodation for 24 second-class and 180 third-class Chinese passengers. The office accommodation is large and roomy, and that for the crew, comradore, and others, is in keeping with this class of vessel. Electric light and fans, steam steering gear, steam windlass and capstan at forward end and steam capstan at after end are installed. The propelling machinery consist of two sets of triple expansion engines with independent condensers and pumps, filters and feed heaters, the steam being generated in a large multitubular cylindrical boiler fitted with forced draft. All the machinery and boilers, as is usual in steamers built by the Dock Co., are being made in their own workshop. The vessel is principally required to carry as much cargo as possible on light draft, and has thus been designed to carry a 1,000 tons cargo on 8 feet draft. She is much the same style as but larger than, the *Kian* and *Siang Tan* built by the same builders for the China Navigation Co. a few years ago, and which have proved very successful. The order was given for the vessel on September 10 of last year, and the contract time to complete was nine months, so the vessel is well within her time, this result being due in a great measure to the resources of the Dock Co. and the large stock of building material always carried by them.

The vessel has been taken to the builders' New Dock sheerlegs to have the boilers lifted on board, the machinery being already installed, and a few weeks should see the vessel ready for her official trials.

On April 23 the U. S. gunboat *Palos* was launched at the Shanghai Dock and Engineering Company's International Dock, the christening ceremony being performed by Mrs. L. S. Border, wife of the superintending constructor. A sistership, the *Monocacy*, was launched at the same dock on April 27, Mrs. A. F. Carter, wife of Lieut. Carter, who is to command the gunboat, performing the christening ceremony. These vessels were originally built at the Government Navy Yard at Mare Island, California, except that the plates were only bolted together. They were then "knocked down" and the various parts crated for shipment to China, being sent out by the Pacific Mail Company's steamer *Mongolia*, which arrived last January. They were erected by the Shanghai Dock and Engineering Company under contract with the Government, the work being supervised by Assistant Naval

Constructor L. S. Border, U. S. N., and Lieut. A. F. Carter, as inspector of machinery, assisted by a draughtsman and quartermaster machinist.

The *Monocacy* and the *Palos* are of 190 tons designed displacement; 160 feet b. p.; 165 feet overall; 24½ feet beam; and 2 feet 5 inches designed draft. They are propelled by twin screws, and are expected to make over 13 knots on trial. The boilers are of the special B. and W. type, and the engines were built at the Mare Island Navy Yard, California.

Kawasaki Dockyard.—The Nippon Yusen Kaisha steamer *Yasaka* has been successfully launched from the Kawasaki Dockyard, Kobe. The *Yasaka Maru* is a sister ship of the *Suwa Maru*, which is now under construction at the Mitsu Bishi Dockyard at Nagasaki. When the equipment of the steamer is completed in October this year, she is to be employed on the Company's European line. Though all the other vessels of the Company have been decorated in English style, the cabins and saloons of the *Yasaka Maru* are to be equipped after the German style. The principal dimensions of the *Yasaka* are as follows:—

Length	505 feet.
Beam.....	63.6 "
Depth.....	37.7 "
Gross tonnage.....	12,000 tons.
Draught	20.600 "
Speed	16 knots.

She will accommodate 122 first class passengers, 60 second class and 180 steerage.

LIGHT AND POWER

Anglo-Japanese Water-Power Electric Co.—This Company intends to increase its capital (now 1,200,000 yen) to 3,000,000 yen for the purpose of establishing a new power station on the Tomoe-gawa, Aichi-ken. At present, the company is generating 3,000 H.P. of electricity, and getting the supply of 2,000 H.P. from the Nagoya Water Power Electric Company. The total 5,000 H.P. is found inadequate to meet the demands of the consumers in Hamamatsu and neighbourhood.

Antung Electricity Works.—At the end of last March the South Manchuria Railway Co. Electricity Works at Antung had 1,500 subscribers using 8,000 lamps convertible to 9,000 lamps on the 16 candlepower basis. Motor supplied to various factories, etc., amounted to 241 horsepower, with applications for 115 horsepower. An alternator, directly coupled with a suction gas engine, ordered from Germany will be installed at the powerhouse No. 1 in June.

COMPANIES

China-Borneo Co., Ltd.—The accounts of this company show a profit of \$120,891.13.

From this had to be deducted:—

Fees to Consulting Committee... 4,000.00

Leaving available for appropriation\$116,891.13

The Consulting Committee recommended that a dividend of \$1.20 per share on the Subscribed Capital be paid to Shareholders

Write off Launches and Lighters 10,000.00

Write off Hongkong Saw Mills 5,000.00

" " Sandakan Saw Mills 7,500.00

" " Plant account 4,000.00

" " Sandakan Engine Works..... 6,000.00

Write off Timber Concessions 1,000.00

Bonus to staff 2,747.06

Transfer to a fund to be formed to provide for insurance of Company's Launches and Lighters	25,000.00
Carry forward	444.07
	\$116,891.13

Hongkong Cotton Spinning, Weaving and Dying Co.—This company has been voluntarily wound up and its business transferred to Shanghai, where operations will be carried on by a new company to be called the Yangtszepoo Cotton Mill, Ltd.

Shanghai Horse Bazaar Co., Ltd.—The audited accounts for the year ended December 31, 1913, showed a balance to the credit of profit and loss account of Tls. 27,306.89, which the directors recommended the shareholders to deal with as follows:—

	Tls.
A Dividend of 8 per cent.	21,600.00
Carry forward to a new "Profit and Loss Account"	5,706.89
	Tls. 27,306.89

Soy Chee Cotton Co., Ltd.—The balance at credit of profit and loss account on December 31, 1913, was Tls. 189,000.147 to be apportioned as follows:—

To pay a dividend of Tls. 6.-, on 20,000 Shares	Tls. 120,000.—
Place to dividend equalization fund	" 20,000.—
Write off for depreciation ..	" 25,000.—
10 per cent. Commission to general managers in accordance with articles of association.. .. .	" 18,584.25
Carry forward to new Account	" 5,415.89

Osaka Shosen Kaisha.—At a recent meeting of the shareholders of this company it was decided to increase the capital by a quarter—Y.8,250,000. The new shares are to be allotted to shareholders at the rate of one for two old shares on June next. Y.12.50 is to be called on each share on a date to be fixed later. When the capital is increased as decided it will stand at Y. 24,750,000 in 49,000 shares of Y. 50 each.

Luzon Sugar Refining Co., Ltd.—This Company's report for the year 1913 and statement of accounts to December 31, 1913 are as follow:—

Owing to the severe competition of Hawaiian Sugars in the local market throughout the year, it was impossible to refine at profitable prices. The result of the year's working shows a loss of \$4,297.32, and, after allowing for interest and other charges, the balance at debit carried forward has been increased to \$69,211.99.

Kabuto Beer Brewery Co. (Japan).—This Company's accounts show:—

	Yen.
Gross earnings for the latter half of 1913	116,537.293
Gross disbursements for the term	107,587.828
Balance	8,949.365
Brought over from last account	1,646.032
Total	11,595.397

This latter amount is to be disposed of in the following manner:—

Legal reserve	450,000
Bonuses for officials.. .. .	250,000
Dividend at 8 per cent.	8,715,000
Carried forward to next account	1,180,997

Onoda Cement Co.—The Onoda Cement Co., running an extensive factory at Chou-shuitzu (the next railway station from Dairen),

at its 57th regular general meeting of the shareholders recently held, passed the reports, statement of accounts, etc., as submitted, for the half-year ended November, 1913.

The substance of the statement of accounts follows:—

Gross profit for the term Y.	1,161,072.657
Gross loss for the term	1,029,288.362
Net profit	131,784.295
Brought forward from the preceding term	111,839.835
	243,724.130
Disposed of as under:—	
Reserve fund	45,000.000
Bonus to officers, &c.	13,900.000
Dividend to shareholders at 8 % per annum	60,000.000
Special dividend to shareholders at 2 % annum	15,000.000
Carried forward to the next term	110,624.130
	243,624.130

Tokyo Gas Co.—The profit and loss account for the last term of six months was as follows:—
Yen.

Net profits for the latter half of 1913	1,636,855.027
Brought over from last account	37,733.028
Total	1,674,588.057
Compensation to the Tokyo Municipality for the use of public roads	98,211.300
Fees for directors and auditors and social expenses	32,737.100
Pension reserves	16,368.559
Loss reserves	82,000.000
Special reserve	92,271.107
Dividend at 9 per cent.	1,353,000.000
Total	1,674,588.057

Kanegafuchi Cotton Spinning Co. (Japan.)—The profit and loss account for the last term of six months was as follows:—
Yen.

Net profit for the latter half of 1913	1,855,198.824
Brought over from last account	1,614,390.737
Total	3,469,589.611
To be distributed:—	
Dividend at 12 per cent.	807,997.800
Special dividend at 4 per cent.	290,332.600
Reserves	150,000.000
Pension reserve	100,000.000
Fund for the improvement of the conditions of operatives	100,000.000
Bonuses for auditors and directors	80,000.000
Carried forward to next account	1,842,259.211

Hongkong Rope Manufacturing Co., Ltd.—The balance at credit of profit and loss account on December 31, 1913, after allowing for the interim dividend of \$60,000 paid in August last was \$63,587.88, which was appropriated as follows:—

Reserve Fund	\$ 1,000.00
Final Dividend of \$1 per share	60,000.00
Carry forward to the credit of next year's account	2,587.88

New Engineering and Shipbuilding Works, Ltd., (Shanghai.)—The balance at credit of profit and loss account on December 31, 1913, which together with the premium on the new issue of shares and the amount brought forward from last year, amounted to Tls. 185,314.48, which was apportioned as follows:—

To pay a dividend of 16 per cent.	50,958.40
Transfer to reserve fund	100,000.00

Transfer to dividend equalization fund	15,000.00
Write off for depreciation	10,000.00
Carry forward to new account	9,356.08
Tls.	185,314.48

Hall and Holtz, Ltd. (Shanghai.)—The statement of the Company's accounts for the year ended February 28, 1914, showed that the profit for the year, including \$9,049.41 brought forward from last year, amounted to \$99,779.81 which the Directors recommended should be disposed of as follows:—

A Dividend of \$2.00 per share (10 per cent.)	\$52,676.00
Carry forward to new account	47,103.81
	\$99,779.81

Union Waterboat Co., Ltd. (Hongkong.)—The annual report and statement of the Company's accounts made up to 31st December, 1913, reads as follows:—The net profits for the year ended 31st December, 1913, after allowing for consulting committee and auditor's fees, amount to \$64,744.63. The general managers recommend the payment of a dividend of 12½ per cent., which will absorb \$34,653.75, write off \$28,000 from the value of the waterboats, \$1,500 off investments, \$400 from the value of pipes and staging, and carry forward a balance of \$190.88 to the new account.

Hongkong, Canton and Macao Steamboat Co., Ltd.—The report of the Board of Directors for the year ending 31st December last says:—

After paying running expenses, salaries, premia of insurance, repairs, an interim dividend of \$80,000 and all other charges there remains, including \$22,845.88 brought forward from last account, the sum of \$197,827.75 at credit of profit and loss account. From this amount the directors recommend that a final dividend for the year of one dollar per share or \$80,000 be paid to shareholders, \$60,000 be written off the book value of steamers and wharves, \$30,000 be transferred to credit of special repairs fund, leaving a balance of \$27,827.75 to be carried forward to new account.

Shanghai Waterworks Co., Ltd.—The report of the directors for the year ended December 31, 1913, states:—

The gross revenue for the year from all sources amounts to Tls. 601,328.79 as against Tls. 571,686.84 in 1912, and that the balance of working account, transferred to credit of profit and loss account, is Tls. 425,503.57 as against Tls. 409,233.65 the previous year.

An interim dividend of 15/- per share at Exchange 2/7¼, absorbing Tls. 92,692.91, was declared and made payable on July 25 last. After writing off Tls. 15,000.00 for depreciation on permanent works, paying interest on Debentures and sundry other items, there remains a sum of Tls. 300,988.36 at credit of profit and loss account available for distribution, which the directors recommend be disposed of as follows:—

To payment of a final dividend for the year of 33/- per share at ex. 2/7¼ per Tael	208,019.28
To equalization of dividend account	20,000.00
To reserve fund	30,000.00
To carry forward to new account	42,969.08
Tls.	300,988.36

Hongkong Land Reclamation Co., Ltd.—The twelfth report of the Board of Directors states that for the year ending 31st December, 1913, the net profits including \$666,852.33 brought forward from last account, after

paying all charges, amount to \$780,788.15. It is now proposed to pay a dividend of 7 per cent. on the paid-up capital, after providing for which and writing off directors' and auditors' fees there remains a balance of \$698,669.57 to be carried to the credit of a new profit and loss account.

Hongkong Land Investment and Agency Co., Ltd.—The twenty-fifth report of the company states that for the year ending 31st Dec., 1913 the net profits including \$16,814.83 brought forward from last account, after paying all charges, amount to \$394,487.78. From this amount an interim dividend of \$3.50 per share has already been paid.

It is now proposed to pay a final dividend of \$3.50 per share, and after writing off directors' and auditors' fees there remains a balance of \$9,550.68 to be carried forward to the credit of a new profit and loss account.

Humphreys Estate & Finance Co., Ltd. (Hongkong.)—The report of the directors for the year ending 31st December, 1913, states:—

The net profit for that period, including \$5,079.50 brought forward from last account amounts to \$92,363.78
From which have to be deducted:—

Remuneration to directors 5 per cent. on net profit	\$4,364.21
Remuneration to General Managers 5 per cent. on net profit	4,364.21
	8,728.42
Leaving a balance of	\$83,635.36

Which the directors recommend should be appropriated as follows:—

Pay a dividend of 50 cents per share	\$75,000.00
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West Point Building Co., Ltd. (Hongkong.)—The twenty-fifth report of this Company states that for the year ending 31st December, 1913, the net profits, including the amount brought forward from the previous year, amount to \$55,512.67. From this amount an interim dividend of \$2 per share has already been paid, and after writing off directors' and auditor's fees, it is now proposed to pay a final dividend of \$2.25 per share, making a total dividend for the twelve months of \$4.25 per share, and to carry forward the balance, \$1,837.67, to the credit of a new profit and loss account.

Hongkong Hotel Co., Ltd.—The profit for the year ended December 31, 1913, amounted to \$200,258.72, which the board of directors recommended should be apportioned as follows:—

To pay a dividend of:—	
\$7.00 per share on 12,000 old shares	\$84,000.00
3½ per share on 8,000 new shares	28,000.00
To transfer to repairs and renewals account	25,000.00
„ write off furniture and fixtures account	25,000.00
„ carry forward to new account	38,258.72

China Fire Insurance Co., Ltd.—The report of the directors for the year ended December 31, 1913, states:—

1912 Account.—This account shows a net profit on working of \$341,403.07 which sum it is proposed to apportion as follows:—

Dividend of \$7.00 and bonus of \$3.00 per share on 20,000 shares ..	\$200,000.00
To add to extra reserve Fund, which will then stand at \$877,588.30 ..	135,013.17
Bonus to office staff	6,389.90
	<hr/>
	\$341,403.07

1913 Account.—The balance at credit
of this account is \$426,277.34

Yangtze Wharf & Godown Co., Ltd.—
The report of the directors for the year ended
December 31, 1913, contains the following:—

The year's working has resulted in a net
profit of Tls. 28,135.52, to which the balance
brought forward from 1912, Tls. 4,477.76 being
added, the sum of Tls. 32,613.28 remains at
credit of profit and loss account to be dealt
with.

This sum it is proposed to appropriate as
follows:—

	Tls.
write off on buildings, pontoons, etc.	5,000.00
write off on steam launch	1,500.00
to pay a dividend of 8 per cent. on capital of Tls. 250,000.00	20,000.00
and to carry forward	6,113.28
	<hr/>
	Tls. 32,613.28

Siamese Tramway Co.—The report of
the Directors of the Siamese Tramway Co.
Ltd. for the year ending December 31, 1913,
was as follows:—

Total receipts	Tcs. 324,467.07
Expenses	226,175.03

Leaving a gross profit for the year of	Tcs. 98,292.04
which after deduction of in- terest Account	Tcs. 2,508.76
Loss on Stock	149.00
Debenture Interest	38,991.06
Depreciation	45,000.00

	Tcs. 86,648.82
leaves a net profit of	Tcs. 11,643.22
added to which the balance from last year	468.76

which makes a total at the dis- posal of the Company of	Tcs. 12,111.98
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it is proposed to distribute this as
follows:—

3 per cent. balance of dividend for 1912 on 1,000 Preferred Shares	Tcs. 3,000.00
8 per cent. Cumulative Interest on Tcs. 3,000.00 for 1913	240.00
8 per cent Dividend on 1,000 Pre- ferred Shares for 1913	8,000.00
and to carry forward	871.98

Total Tcs. 12,111.98

**Union Insurance Society of Canton,
Ltd.**—The balance sheet of the Society on the
31st December, 1913, and a statement of accounts
to the same date were as follow:—

1912 Account.—After payment of the interim
dividend of \$30 per share and the bonus of 20
per cent. to Contributors passed at the last
annual meeting, there remained a balance of
\$966,142.11.

The Board recommended that this sum be
appropriated as follows:—

A final dividend to shareholders of \$20 per share on 12,400 shares ..	\$248,000.00
An addition to the Sterling Reserve Fund of £25,000 at Exchange is. 114d.	258,064.52
To be carried forward to Under- writing Suspense Account to close the account for the year 1912 ..	460,077.59
	<hr/>
	\$966,142.11

**Laou-Kung-Mow Cotton Spinning and
Weaving Co., Ltd. (Shanghai).**—The report
of the general managers. Messrs. Illbert & Co.,
Ltd., contained the following:—

The balance at credit of profit and loss account
at the close of the year, including Tls. 6,455.99
brought forward from 1912, amounts to Tls.
158,623.54 which the directors recommend be
dealt with as follows:—

	Tls.	Tls.
To pay a dividend of Tls. 12.00 per share on 8,000 Shares		96,000.00
To depreciation of mill buildings	9,339.14	
To depreciation plant and machinery	32,268.77	
To depreciation furniture	250.00	
To depreciation and im- provements	1,000.00	
	<hr/>	42,857.91
To 10 per cent. commission on Tls. 109,309.64 (being Tls. 158,623.54 less balance of 1912 account Tls. 6,455.99 and proposed depreciation of Tls. 42,857.91) to the general managers in accordance with their agreement		10,930.96
To be carried forward to new ac- count		8,834.67
	<hr/>	Tls. 158,623.54

Hongkong and Whampoa Dock Co. Ltd.—
The report and balance sheet for the year
ended 31st December, 1913 states that the Gross
Profit for the year is \$391,038.02

Which, after paying Bank Interest	\$122,547.10
Depreciating Plant and Buildings by	76,005.77
And providing for a possi- ble loss on sale of the Dredger "Canton River" of	40,000.00
	<hr/>
	\$238,552.87

Leaves a net profit of	\$152,485.15
And adding amount brought forward from last account	40,911.92

Leaves available a sum of	\$193,397.07
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Which the Directors recommended should be
appropriated as follows:—

To pay a dividend at the rate of 6 per cent. per annum or \$3 per share ..	\$150,000.00
Carry forward to new ac- count	43,397.07
	<hr/>
	\$193,397.07

Hongkong Ice Co., Ltd.—The report for
1913 stated:—Including \$8,335.88 brought for-
ward from the previous year, and after deduct-
ing \$10,000 paid as an interim dividend of \$2
per share on August 18, 1913, the balance at
credit of profit and loss account was \$37,356.12,
which it was recommended should be appro-
priated as follows:—

A Final Dividend of \$7 per share ..	\$35,000.00
To carry forward	2,356.12
	<hr/>
	\$37,356.12

FINANCIAL

The Banque Industrielle Loan.—Accord-
ing to a Peking paper the salient features of
the prospectus of the Loan issued in Paris on
April 7 were as follow:—

The Loan is known as the Five Per Cent.
Gold Industrial Loan of the Government of
the Chinese Republic of 1914. The authorized
amount is Fcs. 150,000,000, of which Fcs.
75,000,000 is to be issued on this occasion.

The loan has been authorized by the President
of the Chinese Republic, his authorization
having been officially notified to the French
Minister at Peking on October 28, 1913.

The amount derived from the present issue
is to be used for "public works," it being
understood that the first of these works to be
undertaken are:

1. The construction of the port of Pukow
on the Yangtze (opposite Nanking).

2. Municipal works to be undertaken in the
city of Peking (tramways, electric lighting,
waterworks, etc.)

Guarantees: The Loan will be specially
secured upon:

1. The construction works mentioned above,
their *materiel*, buildings and products.

2. The municipal taxes of Peking, present
and future (octrois excluded.)

3. By the alcohol taxes in the provinces
North of the Yangtze, officially estimated at
Tls. 4,000,000 (about 14,000,000 fcs).

The concession of these special securities
was officially notified to the French Minister
at Peking on March 12, 1914.

Furthermore, in case the security above-
mentioned proves insufficient the interest and
capital of the loan are further secured by the
general revenues of the Chinese State which
recognizes the loan as a direct obligation.

The present issue consists of 150,000 5 per
cent. Gold Bonds of Fcs. 500 each. These
Bonds bear an annual interest of Fcs 25, pay-
able in two half-yearly instalments of Fcs.
12.50 on March 1 and Sept. 1 each year, with the
exception of coupon No. 1, due on September
1, 1914, the instalment on which will be Fcs
10,416.

The Bonds are free from all Chinese im-
posts.

The repayment of the loan will be by 35
annual drawings, beginning on March 1, 1930.
Between 1924 and 1934 amortization may be
accelerated, but in such case the Chinese
Government will redeem each Bond for Fcs.
512.50.

The Issue price will be 94¼ or Fcs. 471.25
per Bond, payable, Fcs. 100 on subscription,
and the balance on allotment. At this price
the Bonds will yield 5.30 per cent., excluding
the price of redemption.

Subscriptions will take place on April 7 at
the following institutions in Paris: The
Banque Industrielle de Chine, the Credit
Français, and the Société Centrale des Banques
de Province. In the provinces subscriptions
will be received by all Stock Brokers, Bankers,
and members of the Syndicat de Banques de
Province.

If subscriptions exceed the authorized issue,
applicants will only receive a proportionate
amount of Bonds.

Provisional Certificates, to which will be
attached an interest coupon for the instalment
due on September 2, 1914, will be sent to
subscribers at once, and replaced later by
regular Bonds.

The prospectus, of which the original bears
the signature of the French Minister at Paris
contains the following additional particulars:

The loan is for a period of fifty years from
the date of issue.

Amortization will commence on March 1 of
the sixteenth year, i.e. on March 1, 1930.

The sums necessary for amortization will be
paid by the Chinese Government in two equal
half-yearly instalments.

Amortization will be effected by drawings.

These drawings will take place on January
15 of each year (except the first fifteen years)
in accordance with the amounts stipulated in
the amortization table. The repayment of
drawn bonds will be begun on the following
March 1.

The Chinese Government reserves to itself
the right after the expiration of ten years
from the date of issue (i.e. from 1924) after
giving six months' notice of such intention,
to redeem at any time, in whole or in part,
the Bonds of this loan, subject to an additional
premium of 2 ½% in case of amortization
being effected before the twentieth year (i.e.
before 1934).

After the twentieth year (1934) it can effect amortization without any premium.

Additional amortization will be effected by supplementary drawings, which will take place at the same time as the ordinary drawings.

Drawn Bonds will bear no further interest from the date on which they are repayable.

Bonds which are not presented for redemption within thirty years from the date on which they are repayable, will become the property of the Chinese Government.

Appended to the prospectus is a letter from the French Minister of Foreign Affairs to the Banque Industrielle notifying the latter of the receipt from the Chinese Minister in Paris of an official notification of the securities set aside for the service of the new loan.

INSURANCE

Venus Life Insurance Co., Ltd. (Shanghai).—On April 2 this company was inaugurated at 6 A, Hongkong Road, Shanghai. The company has a capital of \$1,000,000, of which a quarter is paid up. Mr. Tang Shao-yi is chairman of the board of directors, the vice-chairman is Mr. Lu Sing, and the others are Dr. Wu Ting-fang, Lord Li Ching-fang, Messrs. Yang Tchong, Tang Wen-sze, Zao Wen-chang, Wong King-fang, Wen Tsung-yao, Ting Pao-chi, Li Mer-tsi, Sung Zong-ying, Pang Kuong-ying, Yi Tseu-chien, managing director, and Chang Bing-foo, sub-managing director. Mr. J. Trevor Smith has been appointed inspector of agents.

While the company has been incorporated in Peking, it is the intention to have it likewise registered in Hongkong. Everything, it is the intention, will be conducted on foreign lines, and policies will be printed both in Chinese and English.

MINING

Kailan Mining Administration.—The total output of the Administration's mines for the week ended February 21, amounted to 49,906.11 tons and the sales during the same period to 54,831.13 tons.

Week ended February 28, output 54,992.86 tons, sales 60,206.31 tons.

Week ended March 7, output, 56,252.50 tons, sales 50,361.92 tons.

Week ended March 14, output, 60,891.88 tons, sales 49,606.18 tons.

Week ended March 21, output 60,096.32 tons, sales 65,024.66 tons.

Week ended March 28, output 60,950.81 tons, sales 59,144.46 tons.

Australian Dredges For Malaya.—The contract for the construction and erection of two large bucket dredges—at a total cost of £40,000—for equipping the property of the Kampong Kauranting Tin Dredging Company, in the Malay States, a concern managed from Sydney, has been placed in Melbourne. The specifications and design are the work of Mr. J. S. Henry, and the dredges contracted for will, it is officially stated, be easily the largest ever built in Australia. The material and workmanship will be as far as possible Australian. The latest improvements found necessary as a result of tin dredging experience in Malaya, including the most recent type of revolving screen, will be fitted in these dredges. Large tin saving tables are another feature—the pontoon being specially large—viz. 130 ft. by 44 ft. by 8½ ft. deep to carry them. The dredges will be fitted with close connected 6 ft. buckets, which will have a theoretical capacity of 35,000 yards per week for each dredge, and effective capacity of 20,000 to 25,000 yards of tin-bearing material per week. The plant specified is designed to dredge 45 ft. below water level. The main engine is of

120 brake h.p., and the pump installed for sluicing has a delivery of 6,000 gallons of water per minute. The cost of the two dredges erected and in good going order on the mine, together with the spares, tools, tin dressing sheds and buildings, will exceed £40,000. The total weight of the dredges, with machinery, will be over 625 tons, which is considerably over 100 tons heavier than the largest dredge yet sent from Australia to the East. The contract time for delivery for the first dredge is eight months, and for the second eleven months from the date of signing the contract.

Malaguit Dredging Co.—This company's new five-foot bucket dredge has begun operations in the Paracale mining district under the supervision of Mr. J. A. Bruce.

Gold Ore Refinery for Chosen.—The *Seoul Press* reports that Mr. Fusano Hisahara, a Japanese capitalist, intends to establish a gold ore refinery at Pyongyang, Chosen (Korea) for the treatment of low grade ore. A similar enterprise maintained by the owners of the Hidachi Mine is in a promising state, and it is expected that should the refinery of Mr. Hisahara be established, the mining interests in Chosen will profit greatly by it in view of the fact that both Japanese and Korean miners on account of comparatively small capital are wasting by no means inconsiderable quantities of gold through the adoption of crude refining methods.

China's Coal Oil Deposits.—According to a report by Hsiung Hsi-ling there are twenty-three coal oil deposits in the Province of Chihli, seventeen in Yunnan, thirteen in Kueichow, eight in Shensi, five each in Kiangsu and Kwangsi, four each in Shansi, Hunan and Fengtien, three in Szechuan, two each in Kirin and Hupeh, and one in Kwangtung, a total of 91.

Seoul Mining Company.—The final dividend of the Seoul Mining Co., for 1913, which was distributed on April 30, 1913, was a further 25 per cent. This makes a total of 50 per cent. for the year.

PERSONAL

The selection of Mr. A. G. Cox, M. I. C. E., as Engineer-in-Chief of the British section of the Hukuang Railways (the section between Wuchang and the Kwangtung frontier) is an eminently desirable one in every way. Mr. Cox has the longest service of any engineer on Chinese railways, and practically twenty years of it have been spent with the Peking-Mukden line, where he has held the position of Deputy Engineer-in-Chief for some years. Mr. Cox takes with him to his new post a complete knowledge of conditions, great capability, and a reputation for integrity and uprightness which is respected by Chinese and foreigners alike. The aim of Mr. Cox will be to build a railway efficiently and economically, and it will be regrettable if he is in any way obstructed in this desire. Mr. Cox has taken up his duties, having relieved Mr. Collinson, the former Engineer-in-Chief, who has left the service of the Chinese Government.

Mr. A. W. U. Pope, C. I. E., has retired from the service of the Chinese Government.

Mr. Harry T. Edwards has been appointed chief of the Philippines Bureau of Agriculture.

Mr. J. W. Gallagher returned from America in April and resumed charge of the office of the United States Steel Products Company in Shanghai. During his absence Mr. W. H. Dietrich was in charge.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS DEPARTMENT OF FINANCE AND JUSTICE BUREAU OF CUSTOMS, MANILA

Bids will be received by the Insular Collector of Customs, Manila, P. I., until twelve o'clock noon, July 1, 1914, for the following vessels:

1. The Cutters "**Busuanga**," "**Tablas**," "**Palawan**," "**Luzon**," "**Panay**," "**Mindanao**," "**Mindoro**," and "**Negros**." These cutters have a gross tonnage of 411.11, length 148 feet, are single screw composite seagoing steam vessels, speed 10½ knots, I. H. P. 500.
2. The twin screw steam vessel **Scout**, gross tonnage 301.33, length 136 feet.
3. The seagoing launch **Sora**, gross tonnage 51, length 90 feet.
4. The seagoing launch **Skua**, gross tonnage 51.13, length 83 feet, 5 inches.
5. The steam launch **Guy Howard**, length 77 feet.
6. One Mullens' auto boat, length 26 feet. Four cylinder Mullens' engine rated at 40 H. P.
7. The gasoline launch **Merlin**, gross tonnage 16.58, length 57 feet, 100 H. P. Speedway engine.
8. Launch No. 3, gross tonnage 17, length 51 feet.
9. The steam launch **Tagalog**, gross tonnage 6.02, length 36 feet. Navy Type cockpit launch.
10. Two ketches, gross tonnage 46.14, length 65 feet, equipped with auxiliary power 45 H. P. Meitz & Weiss kerosene engines, ketch rigged.

Bids must be accompanied by ten per cent. of the sum thereof in the form of cash or an accepted check. The right is reserved to reject any and all bids.

Specifications may be obtained and blue-prints examined at the office of the Inspector of Hulls and Boilers, Manila Customs House, at the American Consulates in Shanghai, Amoy and Hongkong, China; Singapore, S. S.; and Melbourne and Sydney, Australia.

B. HERSTEIN,

Insular Collector of Customs.

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Cigar and Cigarette Manufacturers

Cia. Gral. de Tabacos de Filipinas
Germinal Cigar Factory
Olsen & Co., Walter E.
British.

Coal Mining Co.'s

Chinese Engineering and Mining Co., Ltd.
The Lanchow Mining Co., Ltd.
South Manchuria Railway Co.

Coal Handling Machinery

Babcock & Wilcox Ltd.

Contractors, (General)

Bohler Bros. & Co.
Frank L. Strong
Shanghai Dock & Engineering Co. Ltd.
White & Co. Inc., J. G.

Contractors, Electrical

Shanghai Dock & Engineering Co. Ltd.
Arnhold, Karberg & Co.
Shewan Tomes & Co.
Frank L. Strong
Siemens China Electric Engineering Co.
Dick, Kerr & Co., Ltd.

Consulting Engineers

White & Co., Inc. J. G.

Cranes

Babcock & Wilcox Ltd.
Werf Gusto

Conveyors

Babcock & Wilcox Ltd.

Diving Apparatus

A. J. Morse & Son

Dredgers

Middleton & Co., Ltd.
Melchers & Co.
Priestman Bros. Ltd.
Rose, Downs & Thompson, Ltd.
Shanghai Dock & Engineering Co., Ltd.
Werf Gusto.

Drying System

American Blower Co.

Economizers

Babcock & Wilcox Ltd.

Electric Lighting Plants

Andersen Meyer & Co.
Arnhold, Karberg & Co.
Fearon, Daniel & Co.
General Electric Co.
Siemens China Electric Eng. Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.
Shewan, Tomes & Co.
U. S. Steel Products Co.
Western Electric Co.

Electrical Supplies

Andersen, Meyer & Co.
Arnhold, Karberg & Co.
Jardine, Matheson & Co.
Babcock & Wilcox (D. W. Bell)
Bellis & Morcom (D. W. Bell)
Fearon, Daniel & Co.
General Electric Co.
Melchers & Co.
Shewan, Tomes & Co.
Siemens China Electric Eng. Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.
Western Electric Co.

Engines

Bellis & Morcom (D. W. Bell)
Shanghai Dock & Engineering Co., Ltd.
A. F. Craig & Co.

Excavators and Elevators

Priestman Bros. Ltd.
Rose, Downs & Thompson, Ltd.
Shanghai Dock & Engineering Co., Ltd.
Austin Drainage Excavator Co.

Explosives

Jardine, Matheson & Co.
Arnhold, Karberg & Co.
Rendrock Powder Co.

Fan Blowers

Drysdale & Co.

Feed Water Heaters

Babcock & Wilcox Ltd.

Food Products

Anderson & Co., W. H.

Gas Engines

Melchers & Co.
Campbell Gas Engine Co., Ltd., The

Graphite Paint

J. Dampney & Co.

High Speed Engines

Drysdale & Co.

Hose

F. Reddaway & Co., Fire Hose "Sphincter Grip," Armoured Hose, etc.

Ice Machinery

Vulcan Iron Works
Melchers & Co.

Insurance

Stevenson & Co., Ltd., W. F.

Ironfounders

A. F. Craig & Co.

Life Insurance

China Mutual Life Insurance Co., Ltd.

Locks

Yale & Towne Mfg. Co.

Locomotive Speed Indicator and Recorder

Hasler Telegraph Works.

Lubricants

Albany Lubricating Co.

Lumber Dealers

Robert Dollar Co.
Jardine, Matheson & Co.

Machinery Merchants

Andersen, Meyer & Co.
Arnhold, Karberg & Co.
Shanghai Machine Co.
Fearon, Daniel & Co.
Frank L. Strong
Schuchardt & Schutte.
Shanghai Dock & Engineering Co., Ltd.
Samuel & Co., Ltd.
Tulloch & Co.

Mechanical Rubber Goods

F. Reddaway & Co.

Mill Machinery

Rose Downs & Thompson Ltd.
Shanghai Dock & Engineering Co., Ltd.
A. F. Craig & Co., Ltd.

Mining Machinery

Melchers & Co.
Shanghai Dock & Engineering Co., Ltd.
Shewan, Tomes & Co.

Mineral Oil Plants & Machinery

A. F. Craig & Co.

Motors

Shanghai Dock & Engineering Co., Ltd.
Pratt's

Motor Tyres

F. Reddaway & Co.

Motor Launches

Shanghai Dock & Engineering Co., Ltd.

Paints Oils and Varnish

Standard Oil
Albany Lubricating Co.
F. A. Vander Loo & Co.
J. Dampney & Co.

Packings

F. Reddaway & Co.
Greene Tweed & Co.

Pulleys (Steel)

Schuchardt & Schutte
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.

Pumps

The Goulds Manufacturing Co.
Shewan, Tomes & Co.
Jardine, Matheson & Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.
Joseph Evans & Sons

Railroads

Chinese Government Railways
Manila Railroad Co.
South Manchuria
Southern Pacific Co.
Chosen (Korea) Railways.

Railroad Supplies

American Locomotive Co.
Andersen, Meyer & Co.
Arnhold, Karberg & Co.
Baldwin Locomotive Work.
Fearon, Daniel & Co.
Hannoversche Maschinenbau A. G. Vormalis
Georg Egestorff.
Henschel & Sohn.
P. Herbrand & Co.
Jardine, Matheson & Co., Ltd.
Melchers & Co.
Shewan, Tomes & Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.
Tyer & Co.
U. S. Steel Products Co.

Railway Signal Co., Ltd., The

Robert Dollar Co.
Samuel & Co., Ltd.
Dick, Kerr & Co., Ltd.
Siemens & Co.

Reinforced Concrete Construction

Shanghai Dock & Engineering Co., Ltd.
Trussed Concrete Steel Co.
U. S. Steel Products Co.

Roofing Paper

California Manila Lumber Commercial Co

Rope Manufacturers

Johnson-Pickett Rope Co.
U. S. Steel Products Co.
Ynchausti & Co.
Shewan Tomes & Co.

Ship-Chandlery

Ynchausti & Co.

Shipping Agents

Cia. General de Tabacos
Shewan, Tomes & Co.
Stevenson & Co., Ltd.

Shipbuilding and Repairs

Flat-san Giorgio Ltd.
Tsingtauer Werft
Hongkong & Whampoa Dock Co., Ltd.
Mitsu Bishi Dock and Engineering Works
Shanghai Dock and Engineering Co., Ltd.
The Taikoo Dockyard and Engineering Company of Hongkong, Limited

Steamship Companies

Cia. General de Tabacos
Pacific Mail S. S. Co.
Ynchausti & Co.
Toyo Kisen Kaisha.

Steel Manufacturers

United States Steel Products Export Co.

Steel Works

Bohler Bros. & Co., Ltd.
U. S. Steel Products Co.

Stokers

Babcock & Wilcox Ltd.

Structural Steel

Bohler Bros. & Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.

Sugar Machinery

A. F. Craig & Co.

Superheaters

Babcock & Wilcox Ltd.

Tanks

Pacific Tank and Pipe Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.
A. F. Craig & Co.

Telephones

The Western Electric Co.

Textile Machinery

A. F. Craig & Co.

Tiles and Bricks

Green Island Cement Co., Ltd.
Chinese Eng. Mining Co.

Tobacco Dealers

British-American Tobacco Co., Ltd.
Cia. General de Tabacos
Olsen & Co., Walter E.

Tools

American Tool Works Co.
Lodge & Shipley Machine Tool Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.

Windmills

Defiance Machine Works.

Water Softeners

Babcock & Wilcox Ltd.

Wood Working Machinery

American Tool Works Co.
Defiance Machine Works.
Lodge & Shipley Machine Tool Co.
Shanghai Dock & Engineering Co., Ltd.